Appendix—Tables

Table 1. Technology areas

Technology area*	Description
01- Agriculture	Agriculture and agricultural equipment, animal husbandry, fishing
02- Oil & Gas, Mining	Oil and gas exploration and production, petroleum refining, mining in general
03- Power Generation & Distribution	Conventional and non-conventional power generation, electrical power transmission
04- Food & Tobacco	Food and beverage processing and packaging; beer, spirits, wine and sugar production
05- Textiles & Apparel	Textiles, clothing, shoe manufacturing, leather processing
06- Wood & Paper	Wood and paper products and processes, furniture manufacturing
07- Chemicals	Chemical compositions and processes, excluding pharmaceuticals
08- Pharmaceuticals	Drugs and medicines excluding biotechnology
09- Biotechnology	Genetic engineering and bio-processing
10- Medical Equipment	Non-electronic medical and surgical devices and supplies
11- Medical Electronics	Diagnostic, imaging and surgical equipment
12- Plastics, Polymers & Rubber	Polymer compounds and polymerization processes, working of plastics
13- Glass, Clay & Cement	Glass, cement, ceramics, refractories clay and stone materials and processing
14- Primary Metals	Ferrous and non-ferrous metals processing
15- Fabricated Metals	Metals fabrication and finishing
16- Industrial Machinery & Tools	Presses, industrial machines, tools, miscellaneous engines and parts
17- Industrial Process Equipment	Separation, mixing, coating, drying, furnaces and heat exchange
18- Office Equipment & Cameras	Printing, copying and photographic equipment
19- Heating, Ventilation, Refrigeration	Residential and commercial heating, ventilation, air conditioning and refrigeration equipment
20- Misc. Machinery	Conveying, packaging and storage equipment
21- Computers & Peripherals	Data processing and storage equipment and systems
22- Telecommunications	Telephony, radio and television
23- Semiconductors & Electronics	Configuration and production of semiconductors, lasers and electronic components in general
24- Measurement & Control Equipment	Physical and electrical measurement, and controlling and regulating, methods and devices
25- Electrical Appliances & Components	Domestic and commercial appliances, lighting, batteries and electrical system components
26- Motor Vehicles & Parts	Vehicle bodies, drive trains, suspensions, steering, braking, pollution control
27- Aerospace & Parts	Aircraft, space vehicles, propulsion systems
28- Other Transport	Waterborne vessels, railway equipment and bicycles
29- Misc. Manufacturing	Construction, layered products, ordnance, musical instruments
30- Other	All patents not classified in categories above
All Patents	Total patents of company/organization

*Technology areas based on CHI Research's Tech-Line® technology indicators database.

Table 2. Growth of U.S. patenting 1989–1993 to 1994–1998 by technology area for Australia and nine competitor countries

Technology area	Growth %									
	Australia	Canada	Finland	Israel	Japan	NethInds	Sweden	Taiwan	UK	US
09- Biotechnology	249	127	123	67	42	125	123	864	109	140
21- Computers & Peripherals	174	159	355	379	61	21	142	357	74	135
08- Pharmaceuticals	136	139	198	115	13	27	135	182	26	62
05- Textiles & Apparel	94	(3)	7	29	(7)	(33)	11	120	5	22
14- Primary Metals	71	(5)	144	(13)	(11)	3	(2)	51	(37)	(16)
18- Office Equipment & Cameras	54	37	(4)	23	29	27	(15)	69	0	23
19- Heating, Ventilation, Refrigeration	48	21	(8)	(10)	(5)	(5)	10	60	51	3
12- Plastics, Polymers & Rubber	45	(1)	34	45	(1)	(26)	(13)	228	(22)	(7)
07- Chemicals	41	29	32	21	(5)	(14)	16	112	10	9
10- Medical Equipment	34	43	90	30	6	77	32	98	20	50
25- Electrical Appliances & Components	25	19	32	133	36	(16)	8	116	7	17
02- Oil & Gas, Mining	23	(1)	24	69	19	(52)	(42)	386	(1)	(14)
30- Other	22	22	(14)	24	19	(11)	4	95	-	21
26- Motor Vehicles & Parts	21	22	(10)	14	(16)	18	27	24	(5)	23
28- Other Transport	19	7	56	27	(17)	(23)	(1)	128	(26)	7
20- Misc. Machinery	13	(5)	25	56	(14)	(18)	(16)	104	(21)	0
22- Telecommunications	5	73	491	204	46	31	287	260	23	67
01- Agriculture	3	2	(18)	1	11	(28)	(12)	82	1	17
16- Industrial Machinery & Tools	1	(9)	1	36	(7)	(22)	(10)	66	(24)	(5)
06- Wood & Paper	-	16	25	125	0	7	6	119	7	11
29- Misc. Manufacturing	(1)	6	18	14	8	(21)	4	60	(11)	10
24- Measurement & Control Equipment	(5)	10	16	13	(5)	4	8	77	(22)	10
15- Fabricated Metals	(7)	28	(34)	96	12	(24)	57	174	(34)	1
11- Medical Electronics	(12)	206	80	99	15	157	203	129	78	69
17- Industrial Process Equipment	(14)	6	6	(15)	4	(22)	(12)	102	(11)	1
03- Power Generation & Distribution	(23)	1	118	(23)	12	(34)	10	38	(11)	(0)
04- Food & Tobacco	(23)	(1)	(42)	(7)	(23)	(6)	12	54	(8)	(7)
23- Semiconductors & Electronics	(46)	26	13	78	39	(15)	83	887	(23)	32
13- Glass, Clay & Cement	(59)	(1)	(48)	8	(17)	(36)	(20)	112	(25)	(13)
27- Aerospace & Parts	(60)	29	(14)	80	1	23	(18)	34	(39)	(13)
Total	19	20	44	60	17	(3)	24	130	1	23

(*) - negative growth numbers in parentheses

Table 3. Counts* of Australian-invented† U.S. patents in four 5-year periods for enterprises with at least 10 patents 1979–1998. Fractional counts are rounded to whole numbers. Unified assignees are in bold.

20-Yr. total rank	Company§	1979-1998 Total	1979-83	1984-89	1989-93	1994-98	% Growth b'tween last 2 periods.
1	**CSIRO¶**	318	70	52	57	139	144
2	**COMM. OF AUSTRALIA except CSIRO**	232	37	83	49	64	30
3	**ICI (now ORICA)**	187	62	57	47	22	-53
4	**ST. JUDE MEDICAL INC. (Pacesetter)**	102	18	20	41	23	-43
5	**UNISEARCH LIMITED**	83	25	34	13	11	-15
6	**ORBITAL ENGINE CO. PROPRIETARY LTD.**	78	0	15	30	33	10
7	UNIV MELBOURNE	72	10	5	23	33	42
8	**BROKEN HILL PTY. CO. LTD., THE**	69	15	16	19	19	0
9	**BTR PLC**	43	12	13	8	10	25
10	**CANON INC**	40	0	0	0	40	#N/A
11	**COMALCO ALUMINUM LTD.**	40	2	6	10	22	109
12	UNIV SYDNEY	40	7	4	10	19	100
13	**AUSTRALIAN NAT'L UNIV., THE**	38	2	5	11	21	89
14	**E I DUPONT DE NEMOURS & CO**	37	0	12	21	4	-81
15	**MEMTEC LTD.**	34	0	10	14	10	-32
16	MISC. INDIVIDUAL ASSIGNEES (last 3 yrs)	27	0	0	0	27	#N/A
17	**ALCATEL ALSTHOM CIE GENERALE D'ELECTRICITE**	26	3	0	12	11	-8
18	JOHN LYSAGHT (AUSTRALIA) LTD.	26	6	3	10	8	-21
19	**PHILIPS ELECTRONICS N.V.**	25	4	3	13	5	-62
20	**ILLINOIS TOOL WORKS INC**	25	11	5	3	6	100
21	UNIV QUEENSLAND	25	3	6	7	10	54
22	**BOC GROUP PLC, THE**	24	10	2	4	8	100
23	SEELEY (F.F.) NOMINEES PTY. LTD.	22	0	13	3	6	100
24	**EASTMAN KODAK CO**	22	0	0	1	21	2000
25	AMRAD CORP. LTD.	21	0	0	3	18	500
26	**VARIAN ASSOCIATES INC**	20	8	5	3	4	33
27	MCKAY (RALPH) LTD.	20	8	10	2	0	-100
28	**BISHOP (A.E.) & ASSOC. PTY., LTD.**	19	0	0	4	15	275
29	MONASH UNIV.	19	5	5	2	7	238
30	WARMAN INT'L LTD.	19	2	2	8	7	-13
31	OGDEN INDUSTRIES PTY. LIMITED	18	4	12	2	0	-100
32	**LUDWIG INSTITUTE FOR CANCER RESEARCH**	18	0	0	2	16	700
33	**BREVILLE PTY. LTD.**	17	3	6	2	6	200
34	**BIOTECHNOLOGY AUSTRALIA PTY. LTD.**	16	0	1	2	13	719
35	**ROCHE HOLDING LTD**	16	6	2	1	7	1300
36	MINERAL DEPOSITS LIMITED	15	7	7	1	0	-100
37	HOWARD FLOREY INST. OF EXPERIMENTAL PHYS'L	15	0	2	5	8	60
38	**AINSWORTH NOMINEES PTY. LTD**	15	1	8	6	0	-100
39	N.J. PHILLIPS PTY. LTD.	15	3	8	2	2	-25
40	**NOVARTIS AG**	15	1	4	3	7	117
41	**LUCENT TECHNOLOGIES**	14	1	3	2	8	300
42	LUMINIS PTY. LTD.	14	1	0	6	7	19
43	AMCOR LTD.	14	0	0	5	9	80
44	**UNIVERSITY OF CALIFORNIA**	13	3	2	1	7	600
45	SPOTLESS PLASTICS PTY. LTD.	13	0	0	3	10	233
46	BRITAX RAINSFORDS PTY. LTD.	13	0	0	8	5	-38

Table 3. (cont'd) Counts* of Australian-invented† U.S. patents in four 5-year periods for enterprises with at least 10 patents 1979–1998. Fractional counts are rounded to whole numbers. Unified assignees are in bold.

20-Yr. total rank	Company§	1979-1998 Total	1979-83	1984-89	1989-93	1994-98	% Growth b'tween last 2 periods.
47	**RTZ CORPORATION PLC**	13	0	3	6	4	-33
48	**US DEPT HEALTH & HUMAN SERVICES**	13	1	3	3	6	83
49	**HENDERSONS INDUSTRIES PTY LTD**	12	1	0	1	10	900
50	**RIB LOC AUSTRALIA PTY. LTD.**	12	3	3	3	3	0
51	**COCHLEAR PTY. LTD.**	12	0	1	4	8	88
52	**ALCAN ALUMINUM LTD**	12	3	3	3	3	0
53	FLINDERS UNIVERSITY OF SOUTH AUSTRALIA, TH	12	4	4	1	4	250
54	UNIV WESTERN AUSTRALIA, THE	11	1	0	6	4	-40
55	REPCO LTD.	11	4	7	0	0	#N/A
56	**ISHIKAWAJIMA-HARIMA HEAVY INDUSTRIES CO LT**	11	0	0	3	8	167
57	MOUNT ISA MINES, LTD.	11	0	5	3	3	-9
58	**LUBRIZOL CORP**	11	0	0	11	0	-100
59	**HARNISCHFEGER INDUSTRIES INC**	11	1	2	7	1	-86
60	**AMERICAN HOME PRODUCTS CORP**	10	0	1	1	8	700
61	TECHNOLOGICAL RESOURCES PTY. LTD.	10	0	0	0	10	#N/A
62	**VULCAN AUSTRALIA LTD.**	10	5	1	3	1	-67
63	GENE SHEARS PTY. LTD.	10	0	0	1	9	800
64	ATA TRAINING AIDS PTY. LTD.	10	6	4	0	0	#N/A

* Patent counts other than TOTAL are fractional counts, rounded to the nearest whole number.
Fractional counts occur when patents have been co-assigned, e.g., to a firm and to the government.
CSIRO fractional count = 317.7 but CSIRO is an assignee on 358 U.S. patents

† Australian-invented patents = U.S. utility patents with at least one inventor with an Australian home address

§ Multiple assignee names are unified under a single "parent" name for enterprises shown in bold.

¶ CSIRO patents include 10 from CSIRO Membrane & Biotech Research and 1 from CSIRO Australia Dairy Corp.

Table 4. Counts* of Australian-invented† patents in four 5-year periods for Australian Government assignees with at least five patents 1979–1998

20-Yr. Total Rank	Company	1979-1998 Total	1979-83	1984-89	1989-93	1994-98	% Grwth between last 2 periods.
1	CSIRO**	318	70	52	57	139	144
2	COMMONWEALTH OF AUSTRALIA	99	14	52	24	10	-60
3	TELSTRA CORP. LTD.	13	0	0	0	13	#N/A
4	AUSTRALIAN ATOMIC ENERGY COMMISSION	11	7	3	2	0	-100
5	RESEARCH LABORATORIES OF AUSTRALIA	8	3	2	0	3	#N/A
6	AUSTRALIAN TELECOMMUNICATIONS COMMISSION	6	3	3	0	0	#N/A
7	MEAT RESEARCH CORP.	6	0	0	0	6	#N/A
8	AUSTRALIA NUCLEAR SCI. & TECH. ORGANISATION	5	0	2	3	1	-60
	Other Austrl. Govt. Assignees (<5 pats ea.)	39	5	10	12	12	4
	Other Coassignees (not Govt. Australia)	47	5	12	10	20	99
	TOTAL	550	107	134	106	203	92

* Patent counts other than TOTAL are fractional counts rounded to the nearest whole number
Fractional counts occur when patents have been co-assigned, e.g. to govt. and non-govt. co-assignees.
CSIRO fractional count = 317.7 but CSIRO is an assignee on 358 of the 550 total Austral. Govt. patents

† Australian invented patents = U.S. utility patents with at least one inventor with an Australian home address.

** CSIRO patents include 10 from CSIRO Membrane & Biotech Research and 1 from CSIRO Australia Dairy Corp.

Table 5. Enterprises with the largest number of 1994–1998 Australian-invented U.S. patents by technology area

01- Agriculture	
COMMONWEALTH OF AUSTRALIA	7
INT'L FLOWER DEVELOPMENTS PTY. LTD.	4
MINISTER FOR AGRICULTURE & FISHERIES	3
MALLINCKRODT GROUP, INC.	3
DARATECH PPTY. LTD.	3
WESCONE CRUSHERS PTY LTD	2
STRATHAYR PTY LTD	2
SPEEDLING INC.	2
RECKITT & COLEMAN PLC	2
MOUNT ISA MINES, LTD.	2
GOODMAN FIELDER LIMITED	2
F&M HORWOOD NOMINEES PTY LTD	2
AUSTRALIAN NAT'L UNIV., THE	2

07- Chemicals	
COMMONWEALTH OF AUSTRALIA	39
UNIV MELBOURNE	11
LUDWIG INSTITUTE FOR CANCER RESEARCH	9
ICI AUSTRALIA OPERATIONS PTY. LTD.	8
UNIV SYDNEY	7
AMRAD CORP. LTD.	5
CHIRON CORP	3
COMALCO ALUMINUM LTD.	3
AUSTRALIAN NAT'L UNIV., THE	3
ROCHE HOLDING LTD	3
UK DEPARTMENT OF DEFENSE	3
UNISEARCH LIMITED	3
PLANTAGENET HOLDINGS PTY LTD	3

08- Pharmaceuticals	
COMMONWEALTH OF AUSTRALIA	12
UNIV MELBOURNE	10
PEPTIDE TECHNOLOGY LTD	7
FAULDING (F.H.) & CO. LTD.	6
UNIVERSITY OF FLORIDA	5
AMRAD CORP. LTD.	5
AUSTRALIAN NAT'L UNIV., THE	5
BIOTECH AUSTRALIA PTY LTD	5
ENZACOR PROPERTIES LTD.	5
MALLINCKRODT GROUP, INC.	4
BIOTECHNOLOGY AUSTRALIA PTY. LTD.	4
ROCHE HOLDING LTD	4
MONASH UNIV.	4
IMMULOGIC PHARMACEUTICAL CORP.	3
FLINDERS TECHNOLOGIES PTY LTD	3
GROPEP PTY LTD.	3

09- Biotechnology	
COMMONWEALTH OF AUSTRALIA	18
GENE SHEARS PTY. LTD.	8
AMRAD CORP. LTD.	7
UNIV MELBOURNE	7
HOWARD FLOREY INST. OF EXPERIMENTAL PHYS'LOGY	6
FLINDERS UNIVERSITY OF SOUTH AUSTRALIA, THE	5
US DEPT HEALTH & HUMAN SERVICES	5
LUDWIG INSTITUTE FOR CANCER RESEARCH	5
ROCHE HOLDING LTD	5
UNIVERSITY OF CALIFORNIA	4
AUSTRALIAN NAT'L UNIV., THE	4
BIOTECHNOLOGY AUSTRALIA PTY. LTD.	4
MIT/MASS INST OF TECHNOLOGY	3
LUMINIS PTY. LTD.	3
GARVAN INSTITUTE OF MEDICAL RESEARCH	3

10- Medical Equipment	
EASTLAND TECHNOLOGY AUSTRALIA PTY LTD	8
HEARTPORT INC.	7
UNIV MELBOURNE	3
NOBLE HOUSE GRP PTY LTD	3
AMERICAN HOME PRODUCTS CORP	2
AUSTRALIAN NAT'L UNIV., THE	2
CHIRON INTRAOPTICS, INC.	2
COMMONWEALTH OF AUSTRALIA	2
CONCEPTUS, INC.	2
UNIV QUEENSLAND	2
MYRIADLASE, INC.	2
N.J. PHILLIPS PTY. LTD.	2
RESMED LTD	2
SMITH & NEPHEW PLC	2
TECHBASE PTY LTD	2
HIP DEVELOPMENTS PTY LTD.	2

16- Industrial Machinery	
BISHOP (A.E.) & ASSOC. PTY., LTD.	7
WARMAN INT'L LTD.	4
SPOTLESS PLASTICS PTY. LTD.	4
COMMONWEALTH OF AUSTRALIA	3
IVG AUSTRALIA PTY. LTD.	2
HENROB LIMITED	2
CAROMA INDUSTRIES LTD.	2
BTR PLC	2
BBA GROUP PLC	2

17- Industrial Process Equip	
COMALCO ALUMINUM LTD.	12
COMMONWEALTH OF AUSTRALIA	6
GRACE (WR) & CO	3
BOWIN TECHNOLOGY PTY LIMITED	3
MEMTEC LTD.	3
BAKER HUGHES INC	2
COMPRI TECHNIC PTY. LTD.	2
E I DUPONT DE NEMOURS & CO	2
UNIV SYDNEY	2
MEMTEC AMERICA CORP.	2
ORBITAL ENGINE CO. (AUSTRALIA) PTY. LTD.	2
PORTLAND SMELTER SERVICES PTY. LTD.	2
SEELEY (F.F.) NOMINEES PTY. LTD.	2
TECHNOLOGICAL RESOURCES PTY. LTD.	2
HENKEL KGAA	2

20- Misc. Machinery	
ORBITAL ENGINE CO. (AUSTRALIA) PTY. LTD.	3
BHP STEEL (JLA) PTY LTD	2
BISHOP (A.E.) & ASSOC. PTY., LTD.	2
BTR PLC	2
CASH ENGINEERING RESEARCH PTY. LTD.	2
CLEAN SCREEN WIPERS PTY LTD.	2
COMMONWEALTH OF AUSTRALIA	2
K.C. METAL PRODUCTS PTY. LTD.	2
TOREN CONSULTING PTY LTD.	2
LODERWAY PTY. LTD.	2
MCNEALL ENGINEERING PTY LTD	2
PHILMAC PTY. LTD.	2
PLAYTEX PRODUCTS INC	2
SEAWELL NORTH AMERICA, INC.	2
TETRA LAVAL GROUP	2
JOHN LYSAGHT (AUSTRALIA) LTD.	2

26- Motor Vehicles and Parts	
ORBITAL ENGINE CO. (AUSTRALIA) PTY. LTD.	25
TRANSCOM GAS TECHNOLOGY PTY LTD	6
BISHOP (A.E.) RESEARCH PTY LTD	4
KINETIC LTD	4
ROBERT BOSCH GMBH	4
SCALZO AUTOMOTIVE RESEARCH LTD.	3
REESE PRODUCTS, INC.	2
WORKMAN INDUSTRIES PTY LTD	2
SPORT CARRIERS, INC.	2
BIOCOM PTY. LTD.	2
ALTRACK LTD.	2
AIRBOSS LTD.	2
ENERGY RES & DEV CORP	2

29- Misc Manufacturing	
COMMONWEALTH OF AUSTRALIA	5
JOHN LYSAGHT (AUSTRALIA) LTD.	5
NOVARTIS AG	4
ENI-ENTE NAZIONALE IDROCARBURI	4
ICI AUSTRALIA OPERATIONS PTY. LTD.	3
BTR PLC	3
UNIV SYDNEY	3
ILLINOIS TOOL WORKS INC	3
BCE INCORPORATED	2
BHP STEEL (JLA) PTY LTD	2
CAROMA INDUSTRIES LTD.	2
DEKS THYER PTY. LTD.	2
UNIFRAMES HOLDINGS PTY LTD.	2
TRYCHEST PTY., LTD.	2
TUBE TECHNOLOGY PTY LTD.	2
VINIDEX TUBEMAKERS PTY. LIMITED	2
LAPORTE PLC	2
PILKINGTON PLC	2
SAF-T CORP.	2
STRATCO METAL PROPRIETARY LTD.	2
HELLWEG INT'L PTY. LTD.	2

30- Other	
SPOTLESS PLASTICS PTY. LTD.	4
MODERN ENVIRONMENTAL SERVICE TRUST	3
COMMONWEALTH OF AUSTRALIA	3
AMCOR LTD.	3
UNIV MELBOURNE	2
ILLUMINATION RESEARCH GRP. INC.	2
FUNGI-GULP PTY LTD	2
CONCEPTS DEVELOPMENT AUSTRALIA PTY. LTD.	2
CALDONE PTY. LTD.	2
BOC GROUP PLC, THE	2

* Technology Areas with significant Australian-invented patenting are shown.

Table 6a. Comparison of patent indicators for Australia and nine competitor countries: 1994–1998 U.S. utility patent total counts*

Techology Area	Inventor address:										
	Australia	Canada	Finland	Israel	Japan	NethInd	Sweden	Taiwan	UK	US	World
01- Agriculture	109	430	25	52	1115	82	87	129	308	7627	11514
02- Oil & Gas, Mining	61	255	30	9	370	41	34	17	305	4508	6374
03- Power Generation & Distribution	12	117	26	11	1626	41	75	83	141	3377	6592
04- Food & Tobacco	50	176	20	21	550	193	73	86	224	3935	6394
05- Textiles & Apparel	76	240	29	56	1487	43	67	508	238	7130	12829
06- Wood & Paper	73	430	183	38	458	38	159	411	144	6474	9555
07- Chemicals	197	786	156	174	8257	401	229	146	1896	24142	47054
08- Pharmaceuticals	120	477	58	160	1834	125	228	32	956	10218	17707
09- Biotechnology	106	231	52	74	1198	138	66	32	337	6847	10499
10- Medical Equipment	135	380	47	149	1315	139	274	191	472	17327	22937
11- Medical Electronics	49	108	54	91	690	124	192	16	121	5021	7233
12- Plastics, Polymers & Rubber	60	389	54	35	5309	295	56	202	392	10634	22083
13- Glass, Clay & Cement	8	70	23	4	997	30	23	32	113	1910	3983
14- Primary Metals	33	103	23	4	779	24	52	22	60	1261	2956
15- Fabricated Metals	33	142	33	24	1874	34	99	93	160	3670	7649
16- Industrial Machinery & Tools	145	560	105	142	5194	157	349	767	673	14996	28406
17- Industrial Process Equipment	128	551	184	99	2576	159	235	306	445	11220	19470
18- Office Equipment & Cameras	71	503	15	105	13973	165	77	305	577	11474	30439
19- Heating, Ventilation, Refrigeration	34	156	16	24	636	15	43	84	113	2695	4445
20- Misc. Machinery	160	698	161	64	3124	205	278	550	579	15138	25950
21- Computers & Peripherals	84	457	45	311	18068	383	119	506	831	28242	53053
22- Telecommunications	76	758	431	310	13647	529	540	406	1087	21611	44387
23- Semiconductors & Electronics	25	214	24	77	11352	352	95	1571	375	14102	32068
24- Measurement & Control Equipment	76	423	92	126	4839	223	162	241	617	13775	24218
25- Electrical Appliances & Components	85	552	72	100	6439	256	173	1034	516	15304	28712
26- Motor Vehicles & Parts	132	376	32	26	5412	58	187	323	379	9477	20110
27- Aerospace & Parts	4	36	6	18	108	15	18	11	111	1739	2544
28- Other Transport	61	272	33	14	1061	22	70	350	127	4485	7465
29- Misc. Manufacturing	265	1209	106	142	5498	190	307	864	855	22996	37529
30- Other	125	609	40	66	1575	76	94	829	309	12640	18115
All Patents	2593	11706	2174	2522	121354	4552	4459	10147	13457	313931	572470

*Patent counts are fractional if co-inventors reside in different countries

Table 6b. Comparison of patent indicators for Australia and nine competitor countries: current impact index (CII) — 1994–1998 U.S. utility patents

Techology Area	Inventor address:										
	Australia	Canada	Finland	Israel	Japan	NethInd	Sweden	Taiwan	UK	US	World
01- Agriculture	0.71	0.87	1.30	0.82	0.89	0.89	0.73	1.08	0.71	1.12	1.00
02- Oil & Gas, Mining	0.64	0.87	0.46	1.07	0.84	0.95	0.80	0.89	0.90	1.09	1.00
03- Power Generation & Distribution	0.88	1.08	1.11	0.80	1.02	0.60	0.88	0.78	0.70	1.11	1.00
04- Food & Tobacco	0.80	0.89	1.01	0.62	0.79	0.87	0.60	0.97	0.77	1.13	1.00
05- Textiles & Apparel	0.78	1.17	0.89	0.88	0.77	0.68	0.57	1.34	0.74	1.21	1.00
06- Wood & Paper	0.84	0.93	0.91	0.70	0.85	1.08	0.91	1.05	1.00	1.06	1.00
07- Chemicals	0.82	1.03	0.59	0.71	0.94	0.77	1.00	0.52	0.87	1.16	1.00
08- Pharmaceuticals	0.84	1.12	0.62	0.96	0.59	0.75	0.81	0.41	0.94	1.21	1.00
09- Biotechnology	0.88	1.02	0.71	0.57	0.62	0.96	0.89	0.49	0.73	1.20	1.00
10- Medical Equipment	0.80	0.77	0.64	0.85	0.71	0.75	0.64	0.63	0.79	1.12	1.00
11- Medical Electronics	1.01	0.79	0.51	0.96	0.73	0.71	0.68	0.63	0.90	1.13	1.00
12- Plastics, Polymers & Rubber	1.03	1.06	0.56	0.97	0.89	0.77	0.62	0.78	0.82	1.14	1.00
13- Glass, Clay & Cement	0.22	0.80	0.37	0.13	0.96	0.87	0.77	0.78	1.09	1.14	1.00
14- Primary Metals	1.02	0.93	0.78	0.00	0.94	0.47	1.18	1.22	0.65	1.19	1.00
15- Fabricated Metals	0.56	0.98	0.83	1.85	1.07	0.89	0.63	0.66	0.61	1.15	1.00
16- Industrial Machinery & Tools	0.62	0.91	0.71	1.04	1.13	0.64	0.72	1.09	0.85	1.05	1.00
17- Industrial Process Equipment	0.84	0.85	0.91	0.83	0.99	0.77	0.67	1.11	0.86	1.10	1.00
18- Office Equipment & Cameras	0.58	1.18	0.41	1.08	1.01	0.82	0.66	0.64	0.81	1.10	1.00
19- Heating, Ventilation, Refrigeration	0.78	0.79	0.39	0.63	0.94	0.46	0.54	0.76	1.27	1.07	1.00
20- Misc. Machinery	0.82	0.88	0.76	0.74	0.93	0.83	0.55	1.21	0.85	1.13	1.00
21- Computers & Peripherals	0.85	0.98	0.73	1.15	0.74	0.64	0.79	0.73	0.89	1.29	1.00
22- Telecommunications	1.17	1.21	0.87	1.21	0.84	0.71	1.31	0.73	0.86	1.20	1.00
23- Semiconductors & Electronics	0.56	0.89	0.75	0.84	0.92	0.58	0.62	1.56	0.70	1.15	1.00
24- Measurement & Control Equipment	0.77	0.93	0.55	0.87	1.03	0.85	0.70	0.76	0.82	1.09	1.00
25- Electrical Appliances & Components	0.82	0.97	0.91	1.28	1.06	0.78	0.72	1.01	0.83	1.07	1.00
26- Motor Vehicles & Parts	0.75	0.94	0.46	0.64	1.09	0.47	0.70	0.94	0.83	1.07	1.00
27- Aerospace & Parts	0.31	0.41	1.18	1.03	1.19	1.15	0.72	0.76	0.73	1.07	1.00
28- Other Transport	0.69	0.78	0.75	0.96	1.15	0.44	0.50	1.96	0.80	1.01	1.00
29- Misc. Manufacturing	0.73	0.92	0.70	0.78	1.04	0.72	0.64	0.99	0.75	1.08	1.00
30- Other	0.91	0.92	0.50	0.95	1.03	0.79	0.57	1.20	0.69	1.05	1.00
All Patents	0.73	0.87	0.70	1.01	0.99	0.74	0.75	0.99	0.78	1.13	1.00

Table 6c. Comparison of patent indicators for Australia and nine competitor countries: science linkage (SL) — 1994-1998 U.S. utility patents

Techology Area	Inventor address:										
	Australia	Canada	Finland	Israel	Japan	NethInd	Sweden	Taiwan	UK	US	World
01- Agriculture	1.44	3.18	0.76	3.98	0.85	1.84	1.31	0.10	2.72	3.06	2.55
02- Oil & Gas, Mining	0.09	0.74	0.00	1.25	0.24	0.75	0.03	0.12	0.26	0.96	0.77
03- Power Generation & Distribution	0.91	0.56	0.80	0.09	0.55	0.48	0.05	0.45	0.38	0.71	0.59
04- Food & Tobacco	1.36	1.24	2.14	0.28	0.50	0.45	0.44	0.04	0.61	1.34	1.05
05- Textiles & Apparel	0.19	0.18	0.09	0.08	0.05	0.38	0.03	0.01	0.67	0.23	0.18
06- Wood & Paper	0.11	0.53	0.53	0.00	0.08	0.21	0.63	0.01	0.13	0.27	0.25
07- Chemicals	4.97	5.65	2.26	5.77	1.22	1.83	4.09	1.80	2.33	5.68	3.81
08- Pharmaceuticals	9.47	19.51	4.32	10.09	3.16	6.70	10.21	3.88	6.97	13.52	10.17
09- Biotechnology	16.73	18.53	20.74	11.89	5.73	10.40	7.79	10.52	10.68	20.62	16.76
10- Medical Equipment	0.96	1.22	0.56	1.00	0.18	0.67	0.41	0.08	0.86	1.35	1.14
11- Medical Electronics	4.22	4.13	1.00	4.62	0.45	1.62	1.15	0.44	2.00	3.39	2.82
12- Plastics, Polymers & Rubber	2.12	0.86	0.39	2.27	0.31	0.83	0.24	0.48	0.79	1.66	1.04
13- Glass, Clay & Cement	0.00	1.61	0.13	0.65	0.46	0.54	2.14	0.67	0.64	1.22	0.86
14- Primary Metals	0.55	1.04	0.17	0.29	0.45	0.30	0.53	0.00	0.43	1.77	1.02
15- Fabricated Metals	0.20	1.16	0.45	0.55	0.37	0.21	0.37	0.23	0.36	0.99	0.67
16- Industrial Machinery & Tools	0.03	0.14	0.03	0.25	0.07	0.06	0.04	0.01	0.07	0.21	0.14
17- Industrial Process Equipment	0.25	0.64	0.17	0.59	0.24	0.17	0.29	0.18	0.33	0.89	0.63
18- Office Equipment & Cameras	0.50	0.60	0.02	0.80	0.16	0.57	1.60	0.12	0.68	0.70	0.41
19- Heating, Ventilation, Refrigeration	0.00	0.01	0.00	0.35	0.14	0.07	0.00	0.00	0.40	0.23	0.18
20- Misc. Machinery	0.01	0.09	0.02	0.18	0.04	0.02	0.06	0.00	0.03	0.11	0.08
21- Computers & Peripherals	1.27	1.59	0.51	1.93	0.58	0.88	1.51	0.34	1.39	1.73	1.24
22- Telecommunications	0.83	0.97	0.47	1.70	0.51	0.93	1.80	0.25	1.11	1.29	0.98
23- Semiconductors & Electronics	1.89	1.72	0.36	1.32	1.04	0.40	1.76	0.43	1.78	1.92	1.39
24- Measurement & Control Equipment	1.19	0.85	0.43	0.83	0.41	0.75	0.38	0.18	0.86	1.19	0.90
25- Electrical Appliances & Components	0.12	0.68	0.29	0.39	0.24	0.40	0.35	0.08	0.38	0.49	0.38
26- Motor Vehicles & Parts	0.01	0.06	0.00	0.00	0.05	0.17	0.00	0.00	0.06	0.12	0.08
27- Aerospace & Parts	0.00	0.33	0.00	0.39	0.22	0.20	0.00	0.00	0.12	0.45	0.35
28- Other Transport	0.06	0.07	0.03	0.07	0.06	0.19	0.03	0.00	0.04	0.06	0.06
29- Misc. Manufacturing	0.06	0.15	0.20	0.23	0.25	0.24	0.05	0.05	0.22	0.44	0.35
30- Other	0.85	0.43	0.23	0.98	0.35	0.38	0.39	0.03	0.43	0.47	0.42
All Patents	1.99	2.19	1.08	2.41	0.56	1.18	1.39	0.22	1.62	2.20	1.59

Table 6d. Comparison of patent indicators for Australia and nine competitor countries: technology cycle time (TCT) — 1994-1998 U.S. utility patents

Techology Area	Inventor address:										
	Australia	Canada	Finland	Israel	Japan	NethInd	Sweden	Taiwan	UK	US	World
01- Agriculture	16.3	15.2	12.5	14.1	9.7	13.5	14.0	15.4	11.6	14.9	13.9
02- Oil & Gas, Mining	20.6	13.6	14.4	12.0	11.5	15.2	12.8	15.1	12.3	12.7	12.7
03- Power Generation & Distribution	14.0	12.9	8.1	13.6	7.9	10.5	9.3	8.5	10.3	10.7	10.0
04- Food & Tobacco	16.5	16.7	18.0	16.6	10.9	10.9	12.5	11.9	12.8	13.8	13.2
05- Textiles & Apparel	18.3	18.2	15.1	16.1	11.3	11.6	15.7	12.3	16.1	15.7	14.6
06- Wood & Paper	17.4	14.1	10.6	13.3	11.3	14.1	13.4	12.7	15.0	15.8	14.7
07- Chemicals	12.2	9.6	10.2	10.4	7.5	9.7	10.6	8.6	9.6	9.7	9.4
08- Pharmaceuticals	9.1	8.7	9.7	8.9	7.7	9.5	9.2	6.7	7.5	8.6	8.4
09- Biotechnology	7.3	6.9	8.7	10.8	7.8	8.0	7.5	9.7	8.0	8.2	8.2
10- Medical Equipment	9.0	10.0	10.8	8.7	7.9	8.0	10.0	11.1	10.2	8.8	8.7
11- Medical Electronics	7.2	7.9	7.9	7.4	6.1	7.4	8.2	8.8	8.1	7.7	7.6
12- Plastics, Polymers & Rubber	13.6	10.5	12.9	12.5	8.9	11.4	11.8	11.2	10.9	11.5	11.0
13- Glass, Clay & Cement	17.3	13.4	13.3	11.9	8.7	14.8	10.6	9.9	11.2	12.3	11.5
14- Primary Metals	16.5	13.2	12.7	13.7	8.7	13.7	10.9	12.9	10.3	11.9	11.2
15- Fabricated Metals	18.4	12.8	14.2	7.4	8.4	12.0	11.4	10.9	13.0	11.3	10.5
16- Industrial Machinery & Tools	19.8	16.8	12.6	14.7	8.7	14.2	14.1	13.4	14.4	14.5	13.0
17- Industrial Process Equipment	15.1	14.3	11.5	12.7	10.0	13.0	14.4	11.5	13.6	12.6	12.2
18- Office Equipment & Cameras	10.2	7.9	15.3	10.2	6.6	7.1	8.6	7.4	8.5	8.6	7.6
19- Heating, Ventilation, Refrigeration	13.7	14.8	15.4	15.4	10.1	17.4	17.5	13.7	12.1	12.8	12.3
20- Misc. Machinery	17.8	15.2	13.1	17.2	9.6	15.5	15.5	12.8	15.4	14.9	14.1
21- Computers & Peripherals	6.4	6.4	6.8	5.7	5.8	6.4	6.7	4.9	6.1	6.1	6.0
22- Telecommunications	6.6	6.2	5.4	6.9	5.8	5.8	6.1	5.2	6.3	6.4	6.2
23- Semiconductors & Electronics	8.7	6.6	8.2	7.5	5.9	7.2	7.7	4.1	7.5	6.6	6.3
24- Measurement & Control Equipment	10.9	11.0	7.9	8.0	6.9	8.6	8.9	8.7	9.1	9.0	8.5
25- Electrical Appliances & Components	12.5	10.4	8.6	10.1	7.2	8.0	11.4	7.8	9.9	10.4	9.6
26- Motor Vehicles & Parts	15.2	12.1	13.5	13.9	6.1	9.7	11.0	8.6	9.3	10.5	8.7
27- Aerospace & Parts	24.3	20.1	16.2	16.4	13.7	14.4	13.0	20.9	13.8	14.9	14.7
28- Other Transport	15.5	17.3	21.1	21.6	8.0	25.8	16.8	7.5	15.6	14.9	13.4
29- Misc. Manufacturing	17.6	14.8	13.0	13.1	8.2	11.5	14.6	11.3	12.8	13.2	12.3
30- Other	15.5	12.9	15.2	11.0	8.4	10.7	15.1	8.2	12.7	12.7	11.8
All Patents	13.0	11.2	9.4	9.0	6.8	8.9	9.8	7.6	9.6	10.0	9.1

Table 7. Top-cited 1989-1998 Australian-invented U.S. patents (ranked by number of citations received, minimum of 25)

Pat. No.	Grant Date	Tech. Area	Parent Company	Cites Recd	Title
5235595	8/10/93	22-Telecom	Tyco International LTD	65	Packet switching
5050166	9/17/91	22-Telecom	** UNASSIGNED **	63	Transfer of messages in a multiplexed system
4868832	9/19/89	21-Comput	NETWORK SECURITY SYSTEMS, INC.	61	COMPUTER POWER SYSTEM
4833092	5/23/89	07-Chem	COSELCO MIMOTOPES PTY. LTD.	56	METHOD FOR DETERMINING MIMOTOPES
5314754	5/24/94	29-MiscMfg	GOODMAN FIELDER WATTIE AUSTRALIA LTD.	46	Starch derived shaped articles
5268187	12/7/93	04-FoodTob	QUINLAN (M.J.) & ASSOCIATES PTY. LTD.	41	Method and apparatus for producing thin sheets of starch containing food material
4930158	5/29/90	22-Telecom	** UNASSIGNED **	39	SELECTIVE VIDEO PLAYING SYSTEM
5421031	5/30/95	22-Telecom	DELTA BETA PTY. LTD.	39	Program transmission optimisation
5103367	4/7/92	25-ElecAppl	Unisearch Limited	36	Electrostatic chuck using A.C. field excitation
5164985	11/17/92	22-Telecom	** UNASSIGNED **	36	Passive universal communicator system
4893304	1/9/90	22-Telecom	Science Applications Int'l	35	BROADBAND PACKET SWITCH WITH COMBINED QUEUING
5199424	4/6/93	10-MedEqp	** UNASSIGNED **	35	Device for monitoring breathing during sleep and control of CPAP treatment that is pati ent controlled
4810935	3/7/89	17-IndPrEqp	AUSTRALIAN NAT'L UNIV., THE	34	METHOD AND APPARATUS FOR PRODUCING LARGE VOLUME MAGNETOPLASMAS
4922244	5/1/90	22-Telecom	UNIV WESTERN AUSTRALIA, THE	34	QUEUEING PROTOCOL
5433700	7/18/95	10-MedEqp	Heartport Inc.	34	Method for intraluminally inducing cardioplegic arrest and catheter for use therein
4846161	7/11/89	10-MedEqp	** UNASSIGNED **	31	METHOD AND APPARATUS FOR REMOVING PROSTHETIC CEMENT
5034004	7/23/91	10-MedEqp	UNIV MELBOURNE	31	Infusion pump and drive systems therefor
5272747	12/21/93	22-Telecom	AUSTRALIAN & OVERSEAS TELECOMMUN. CORP. LTD.	31	Mobile pay telephone system
4972368	11/20/90	21-Comput	STALLION TECHNOLOGIES, PTY LTD.	30	INTELLIGENT SERIAL I/O SUBSYSTEM
5063560	11/5/91	22-Telecom	ADVANCED SYSTEMS RESEARCH PTY. LTD.	29	Spread-spectrum multiplexed transmission system
5245995	9/21/93	10-MedEqp	RESCARE LTD.	29	Device and method for monitoring breathing during sleep, control of CPAP treatment, and pr eventing of apnea
4871351	10/3/89	10-MedEqp	** UNASSIGNED **	28	IMPLANTABLE MEDICATION INFUSION SYSTEM
5047032	9/10/91	10-MedEqp	Smith & Nephew PLC	28	Method and apparatus for cutting joint surfaces
5099845	3/31/92	11-MedElct	MICRONIX PTY LTD.	28	Medical instrument location means
5131087	7/14/92	21-Comput	Storage Technology Corp	28	Computer system having apparatus for automatically redistributing data records stored therein
5148377	9/15/92	24-MeasCntr	** UNASSIGNED **	28	Coordinate measuring system
5157657	10/20/92	22-Telecom	AUSTRALIAN TELECOMMUNICATION CORP.	28	Communications method for a shared-medium communications method
4819795	4/11/89	20-MiscMch	** UNASSIGNED **	27	PACKAGE FOR FOOTWEAR
4895151	1/23/90	11-MedElct	St. Jude Medical Inc.	27	APPARATUS AND METHOD FOR THERAPY ADJUSTMENT IN IMPLANTABLE
4930160	5/29/90	22-Telecom	** UNASSIGNED **	27	AUTOMATIC CENSORSHIP OF VIDEO PROGRAMS

Table 7. Top-cited 1989-1998 Australian-invented U.S. patents (ranked by number of citations received, minimum of 25)

Pat. No.	Grant Date	Tech. Area	Parent Company	Cites Recd	Title
4961418	10/9/90	10-MedEqp	** UNASSIGNED **	27	HEAT RETAINING FABRIC AND PHYSICAL THERAPY APPLIANCES
5144660	9/1/92	22-Telecom	** UNASSIGNED **	27	Securing a computer against undesired write operations to or read operations from a mass storage device
5194392	3/16/93	07-Chem	COMMONWEALTH SERUM LAB. COMMISSION	27	Method of determining mimotopes
4919823	4/24/90	17-IndPrEqp	Bayer AG	26	BLOOD BAG SYSTEM WITH INTEGRAL FILTERING MEANS
4940054	7/10/90	11-MedElct	St. Jude Medical Inc.	26	APPARATUS AND METHOD FOR CONTROLLING MULTIPLE SENSITIVITIES IN ARRHYTHMIA CONTROL SYSTEM INCLUDING POST THERAPY PACKING DELAY
5193184	3/9/93	21-Comput	Storage Technology Corp	26	Deleted data file space release system for a dynamically mapped virtual data storage subsystem
5353614	10/11/94	26-MotVeh	A.B.A. MARKETING PTY. LTD.	26	Vehicle steering-wheel lock
5459860	10/17/95	21-Comput	IBM	26	Computerized system and process for managing a distributed database system
4840271	6/20/89	20-MiscMch	SEAWELL CORP. N.V.	25	IMPROVED THERMOPLASTIC SKIN PACKING MEANS
5087570	2/11/92	01-Agricult	** UNASSIGNED **	25	Homogeneous mammalian hematopoietic stem cell composition

Table 8. Technology area distribution of highly cited, Australian-invented 1989—1998 U.S. patents

Technology Area	No. of top-cited pats.	% of pats.
10- Medical Equipment	41	17
22- Telecommunications	31	21
11- Medical Electronics	25	24
21- Computers & Peripherals	21	18
17- Industrial Process Equipment	19	7
07- Chemicals	17	5
29- Misc. Manufacturing	17	3
20- Misc. Machinery	16	5
24- Measurement & Control Equipment	15	10
26- Motor Vehicles & Parts	15	6
30- Other	13	6
12- Plastics, Polymers & Rubber	12	12
09- Biotechnology	10	7
05- Textiles & Apparel	7	6
06- Wood & Paper	7	5
23- Semiconductors & Electronics	7	10
08- Pharmaceuticals	5	3
18- Office Equipment & Cameras	5	4
01- Agriculture	4	2
03- Power Generation & Distribution	4	15
04- Food & Tobacco	4	3
16- Industrial Machinery & Tools	3	1
25- Electrical Appliances & Components	3	2
28- Other Transport	3	3
02- Oil & Gas, Mining	2	2
14- Primary Metals	2	4
15- Fabricated Metals	1	1
Total patents with 10 or more cites	309	6

Note: Among top-cited patents, none are in the following technology areas: 13—Glass, clay,cement; 19—Heat, vent, refrig.; or 27—Aerospace & parts.)

Table 9. Enterprises* with the largest numbers of highly cited, Australian-invented 1989–1998 U.S. patents

Enterprise	No. of top-cited pats.	% of pats.
ST. JUDE MEDICAL INC. (formerly Telectronics Pty Ltd)	18	5.8
ORBITAL ENGINE CO. PROPRIETARY LTD.	9	2.9
COMMONWEALTH OF AUSTRALIA (INCL. CSIRO)	8	2.6
UNIV MELBOURNE	6	1.9
IBM	5	1.6
SEAWELL CORP. N.V.	4	1.3
WRAY-TECH INSTRUMENTS, INC.	4	1.3
ALBION HAT & CAP CO. PTY. LTD.	3	1.0
AUSMEDICS PTY. LTD.	3	1.0
FAULDING (F.H.) & CO. LTD.	3	1.0
LUCENT TECHNOLOGIES	3	1.0
STORAGE TECHNOLOGY CORP	3	1.0
UNISEARCH LIMITED	3	1.0
AINSWORTH NOMINEES PTY. LTD	2	0.6
AUSTRALIAN NAT'L UNIV., THE	2	0.6
BRIDGESTONE CORP	2	0.6
CANON INC	2	0.6
COCHLEAR PTY. LTD.	2	0.6
COMERFORD; ERNEST	2	0.6
IMPERIAL CHEMICAL INDUSTRIES PLC	2	0.6
MEMTEC LTD.	2	0.6
MOBIL CORPORATION	2	0.6
RESCARE LTD.	2	0.6
TYCO INTERNATIONAL LTD	2	0.6
UNIV SYDNEY	2	0.6
UNIV WESTERN AUSTRALIA, THE	2	0.6
VARIAN ASSOCIATES INC	2	0.6
All other assigned (<2 patents each)	142	46.0
Unassigned	67	21.7
Total patents with 10 or more cites	309	100.0

* Multiple assignee names are unified under a single "parent' name for enterprises shown in bold.

Table 10. Science referencing: the average numbers of science references per U.S. patent for selected countries

Science Linkage

Inventor Country	Chemical Patents [PG 4]*				Drug and Medicine Patents [PG 14]*				Electronic Component Patents [PG 43]*				Professional and Scientific Instrument Patents [PG 55]*			
	1985	1990	1995	1997	1985	1990	1995	1997	1985	1990	1995	1997	1985	1990	1995	1997
Australia	0.44	0.57	3.84	6.64	2.52	2.34	10.83	9.82	0.39	0.25	0.31	0.38	0.97	0.69	2.77	2.16
Canada	0.86	1.34	4.14	8.52	1.89	4.12	11.89	19.02	0.27	1.03	1.26	0.97	0.55	0.57	1.68	1.92
Finland	0.61	1.37	2.40	3.40	3.88	3.56	5.93	12.62	0.07	0.09	0.62	0.27	0.82	0.07	0.95	1.91
Israel	1.28	1.01	7.02	5.02	6.32	2.66	12.27	8.70	0.70	1.31	1.24	1.82	0.81	0.35	2.23	1.34
Netherlands	0.50	1.00	2.02	3.86	4.48	7.09	5.58	9.92	0.25	0.41	0.68	0.78	0.12	0.29	0.91	1.32
Sweden	0.88	0.94	4.25	6.16	2.27	1.90	10.64	9.36	0.26	0.41	1.26	1.61	0.16	0.35	1.00	1.49
Taiwan	0.62	0.19	0.54	3.48	0.00	0.00	10.63	4.86	0.00	0.19	0.42	0.25	0.00	0.00	0.19	0.23
UK	0.68	1.05	2.50	3.44	1.33	2.66	5.26	9.82	0.44	0.70	1.20	1.09	0.39	0.76	1.35	1.93
US	0.94	1.85	4.63	8.10	3.05	5.48	11.61	18.05	0.53	0.93	1.28	1.43	0.58	0.84	1.72	3.06
All Countries	0.74	1.30	3.18	5.41	2.17	3.78	8.66	14.00	0.45	0.73	1.00	1.05	0.41	0.58	1.27	2.17

Number of Patents

Inventor Country	Chemical Patents [PG 4]*				Drug and Medicine Patents [PG 14]*				Electronic Component Patents [PG 43]*				Professional and Scientific Instrument Patents [PG 55]*			
	1985	1990	1995	1997	1985	1990	1995	1997	1985	1990	1995	1997	1985	1990	1995	1997
Australia	25	31	33	51	4	8	29	36	20	34	33	29	38	54	67	47
Canada	99	137	168	210	18	33	66	117	127	206	200	226	137	172	256	273
Finland	9	24	41	35	4	5	13	16	7	12	59	49	15	34	37	47
Israel	16	30	35	47	5	17	21	35	18	35	76	96	30	66	58	76
Netherlands	79	122	94	113	9	16	21	46	149	234	206	162	85	75	86	75
Sweden	46	50	50	68	13	15	27	51	56	49	96	103	90	86	113	95
Taiwan	7	13	30	48	1	1	7	10	16	77	371	387	18	57	117	135
UK	368	423	406	435	104	141	136	241	254	351	363	291	279	366	338	355
US	4798	4913	5358	6141	704	1171	1668	3138	4330	5998	8298	8503	4791	6309	8177	8095
All Countries	8815	10132	10632	11720	1426	2277	2954	5003	7807	12076	17066	17212	8842	12203	14328	13709

Note: Patents are counted fractionally

*PG=product group based on SIC

Table 11. Citations from 1990–1997 U.S.-issued patents, by country of citing patent inventor and country of cited paper institution: all fields

FROM: country of patent	TO: country of paper											
	AUSTRALIA	CANADA	FINLAND	ISRAEL	NETHER-LANDS	REP. OF CHINA (TAIWAN)	SWEDEN	UNITED KINGDOM	UNITED STATES	OTHER	TOTAL	Fraction of all references
AUSTRALIA	582	77	15	28	40	4	52	218	1,234	488	2,739	0.6%
CANADA	194	2,161	63	102	196	4	217	825	5,525	2,435	11,722	2.5%
FINLAND	8	34	166	5	37	0	26	82	476	219	1,053	0.2%
ISRAEL	34	77	11	351	43	14	62	177	1,330	585	2,683	0.6%
NETHERLANDS	51	76	12	11	389	8	49	242	1,226	732	2,797	0.6%
REP. OF CHINA (TAIWAN)	3	24	1	4	14	104	10	17	322	265	763	0.2%
SWEDEN	37	63	19	18	56	2	543	196	1,364	574	2,872	0.6%
UNITED KINGDOM	166	352	43	65	187	16	179	2,910	5,030	2,966	11,915	2.6%
UNITED STATES	4,573	10,386	1,145	3,020	4,988	510	5,011	23,872	225,499	75,276	354,278	76.8%
OTHER	754	1,721	263	485	1,050	161	764	4,617	30,569	29,916	70,300	15.2%
TOTAL	6,402	14,971	1,738	4,091	6,998	823	6,913	33,155	272,574	113,456	461,121	100.0%
Fraction of all citations	1.4%	3.2%	0.4%	0.9%	1.5%	0.2%	1.5%	7.2%	59.1%	24.6%	100.0%	

Note: Fractional country counts of both patents and papers

Table 12. Citations from 1990–1997 U.S.-issued patents, by country of citing patent inventor and country of citing paper institution

A. As a percentage of all citations from a country's citing patents: all fields

FROM: country of patent	TO: country of paper											
	AUSTRALIA	CANADA	FINLAND	ISRAEL	NETHER-LANDS	REP. OF CHINA (TAIWAN)	SWEDEN	UNITED KINGDOM	UNITED STATES	OTHER	TOTAL	Total references
AUSTRALIA	21.3	2.8	0.6	1.0	1.5	0.1	1.9	8.0	45.1	17.8	100.0	2,739
CANADA	1.7	18.4	0.5	0.9	1.7	0.0	1.8	7.0	47.1	20.8	100.0	11,722
FINLAND	0.7	3.3	15.7	0.5	3.6	0.0	2.4	7.8	45.2	20.8	100.0	1,053
ISRAEL	1.3	2.9	0.4	13.1	1.6	0.5	2.3	6.6	49.6	21.8	100.0	2,683
NETHERLANDS	1.8	2.7	0.4	0.4	13.9	0.3	1.8	8.6	43.8	26.2	100.0	2,797
REP. OF CHINA (TAIWAN)	0.4	3.1	0.1	0.5	1.8	13.6	1.4	2.2	42.2	34.7	100.0	763
SWEDEN	1.3	2.2	0.7	0.6	1.9	0.1	18.9	6.8	47.5	20.0	100.0	2,872
UNITED KINGDOM	1.4	3.0	0.4	0.5	1.6	0.1	1.5	24.4	42.2	24.9	100.0	11,915
UNITED STATES	1.3	2.9	0.3	0.9	1.4	0.1	1.4	6.7	63.7	21.2	100.0	354,278
OTHER	1.1	2.4	0.4	0.7	1.5	0.2	1.1	6.6	43.5	42.6	100.0	70,300
Total citations	6,402	14,971	1,738	4,091	6,998	823	6,913	33,155	272,574	113,456		461,121

Note: Fractional country counts of both patents and papers

B. As a percentage of all cites to a country's cited papers: all fields

FROM: country of patent	TO: country of paper										
	AUSTRALIA	CANADA	FINLAND	ISRAEL	NETHER-LANDS	REP. OF CHINA (TAIWAN)	SWEDEN	UNITED KINGDOM	UNITED STATES	OTHER	Total references
AUSTRALIA	9.1	0.5	0.9	0.7	0.6	0.5	0.7	0.7	0.5	0.5	2,739
CANADA	3.0	14.4	3.6	2.5	2.8	0.5	3.1	2.5	2.0	2.1	11,722
FINLAND	0.1	0.2	9.5	0.1	0.5	0.0	0.4	0.2	0.2	0.2	1,053
ISRAEL	0.5	0.5	0.6	8.6	0.6	1.6	0.9	0.5	0.5	0.5	2,683
NETHERLANDS	0.8	0.5	0.7	0.3	5.6	1.0	0.7	0.7	0.4	0.6	2,797
REP. OF CHINA (TAIWAN)	0.0	0.2	0.1	0.1	0.2	12.6	0.1	0.0	0.1	0.2	763
SWEDEN	0.6	0.4	1.1	0.5	0.8	0.2	7.9	0.6	0.5	0.5	2,872
UNITED KINGDOM	2.6	2.4	2.5	1.6	2.7	2.0	2.6	8.8	1.8	2.6	11,915
UNITED STATES	71.4	69.4	65.9	73.8	71.3	62.0	72.5	72.0	82.7	66.3	354,278
OTHER	11.8	11.5	15.1	11.9	15.0	19.5	11.1	13.9	11.2	26.4	70,300
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	461,121
Total citations	14,971	6,402	14,230	20,629	41,231	6,998	6,913	7,224	33,155	272,574	

Note: Fractional country counts of both patents and papers

Table 13. 1991 publication rates by field and major country: fraction of a country's papers in a field as a percentage of all papers in that field

Field	Biomedicine	Chemistry	Physics	Engineering & Technology	Total*
AUSTRALIA	2.1	1.3	1.1	1.3	2.0
CANADA	4.2	2.8	2.9	5.2	4.3
FINLAND	0.8	0.3	0.4	0.5	0.6
ISRAEL	1.0	0.5	0.9	0.8	0.9
NETHERLANDS	2.3	1.6	1.6	1.3	2.0
REP. OF CHINA (TAIWAN)	0.3	0.8	0.6	1.7	0.5
SWEDEN	2.2	1.0	1.0	0.9	1.6
U K	9.1	5.8	5.5	6.8	7.7
U S	39.3	23.4	29.8	35.9	35.4
OTHER	38.7	62.5	56.2	45.6	44.9
WORLD	100.0	100.0	100.0	100.0	100.0

* Total includes also the fields of Biology, Earth & Space, and Mathematics. The fields of Psychology, Social Sciences, Professional Fields, and Health Sciences were not included

Table 14. Citation ratios: from 1990–1997 U.S.-issued patents, by country of citing patent inventor and country of cited paper institution as a percentage of all citations from a country's citing patents, divided by the cited country's 1991 publication rates — all fields

FROM: country of patent	TO: country of paper										
	AUSTRALIA	CANADA	FINLAND	ISRAEL	NETHER-LANDS	REP. OF CHINA (TAIWAN)	SWEDEN	UNITED KINGDOM	UNITED STATES	OTHER	TOTAL
AUSTRALIA	10.4	0.7	0.9	1.1	0.7	0.3	1.1	1.0	1.3	0.4	1.0
CANADA	0.8	4.3	0.8	0.9	0.8	0.1	1.1	0.9	1.3	0.5	1.0
FINLAND	0.3	0.8	24.2	0.6	1.8	0.0	1.5	1.0	1.3	0.5	1.0
ISRAEL	0.6	0.7	0.6	14.2	0.8	1.0	1.4	0.9	1.4	0.5	1.0
NETHERLANDS	0.9	0.6	0.7	0.4	7.0	0.6	1.1	1.1	1.2	0.6	1.0
REP. OF CHINA (TAIWAN)	0.2	0.7	0.2	0.5	0.9	26.8	0.8	0.3	1.2	0.8	1.0
SWEDEN	0.6	0.5	1.0	0.7	1.0	0.1	11.5	0.9	1.3	0.4	1.0
UNITED KINGDOM	0.7	0.7	0.6	0.6	0.8	0.3	0.9	3.2	1.2	0.6	1.0
UNITED STATES	0.6	0.7	0.5	0.9	0.7	0.3	0.9	0.9	1.8	0.5	1.0
OTHER	0.5	0.6	0.6	0.7	0.8	0.5	0.7	0.9	1.2	0.9	1.0

Table 15. Top journals publishing Australian-authored papers cited in 1988—1997 U.S. patents (whole counts)

Journal	Cites	Cited papers
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA	399	101
NATURE	332	52
NUCLEIC ACIDS RESEARCH	239	59
EMBO JOURNAL	138	32
AUSTRALIAN JOURNAL OF CHEMISTRY	134	74
SCIENCE	101	24
JOURNAL OF IMMUNOLOGICAL METHODS	100	39
JOURNAL OF BIOLOGICAL CHEMISTRY	96	41
CELL	91	22
JOURNAL OF IMMUNOLOGY	88	41
BIOCHEMICAL AND BIOPHYSICAL RESEARCH COMMUNICATIONS	85	26
GENE	73	26
BIOCHEMICAL JOURNAL	69	28
BLOOD	68	25
CANCER RESEARCH	65	32
JOURNAL OF CHEMICAL SOCIETY	61	35
JOURNAL OF GENERAL VIROLOGY	55	23
TRANSACTIONS OF THE IEEE	55	34
JOURNAL OF EXPERIMENTAL MEDICINE	53	14
VIROLOGY	53	23
MEDICAL JOURNAL OF AUSTRALIA	52	25
INFECTION AND IMMUNITY	52	29
TETRAHEDRON LETTERS	52	26
IMMUNOLOGY AND CELL BIOLOGY	51	20
LANCET	51	20
MOLECULAR IMMUNOLOGY	47	12
ANALYTICAL BIOCHEMISTRY	47	25
IMMUNOLOGY	43	23
JOURNAL OF THE AMERICAN CHEMICAL SOCIETY	42	17
JOURNAL OF CLINICAL MICROBIOLOGY	41	25
EXPERIMENTAL HEMATOLOGY	40	13
JOURNAL OF ENDOCRINOLOGY	39	23
ENDOCRINOLOGY	38	20
JOURNAL OF CLINICAL ENDOCRINOLOGY AND METABOLISM	37	15

Table 16. Top journals publishing Australian-authored biomedical papers cited in 1988—1997 U.S. patents (whole counts)

Journal	Cites	Cited papers
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA	399	101
NATURE	332	52
NUCLEIC ACIDS RESEARCH	239	59
EMBO JOURNAL	138	32
SCIENCE	101	24
JOURNAL OF IMMUNOLOGICAL METHODS	100	39
JOURNAL OF BIOLOGICAL CHEMISTRY	96	41
CELL	91	22
JOURNAL OF IMMUNOLOGY	88	41
BIOCHEMICAL AND BIOPHYSICAL RESEARCH COMMUNICATIONS	85	26
GENE	73	26
BIOCHEMICAL JOURNAL	69	28
BLOOD	68	25
CANCER RESEARCH	65	32
JOURNAL OF GENERAL VIROLOGY	55	23
VIROLOGY	53	23
JOURNAL OF EXPERIMENTAL MEDICINE	53	14
INFECTION AND IMMUNITY	52	29
MEDICAL JOURNAL OF AUSTRALIA	52	25
LANCET	51	20
IMMUNOLOGY AND CELL BIOLOGY	51	20
MOLECULAR IMMUNOLOGY	47	12
ANALYTICAL BIOCHEMISTRY	47	25
IMMUNOLOGY	43	23
JOURNAL OF CLINICAL MICROBIOLOGY	41	25
EXPERIMENTAL HEMATOLOGY	40	13
JOURNAL OF ENDOCRINOLOGY	39	23
ENDOCRINOLOGY	38	20
JOURNAL OF CLINICAL ENDOCRINOLOGY AND METABOLISM	37	15
AUSTRALIAN VETERINARY JOURNAL	35	24
JOURNAL OF INFECTIOUS DISEASES	34	12
EUROPEAN JOURNAL OF BIOCHEMISTRY	34	16
MOLECULAR AND BIOCHEMICAL PARASITOLOGY	33	16

Table 17. Top journals publishing Australian-authored biology papers cited in 1988—1997 U.S. patents (whole counts)

Journal	Cites	
PHYTOCHEMISTRY	20	10
SOIL BIOLOGY & BIOCHEMISTRY	13	3
PLANT PHYSIOLOGY	12	6
ANNUAL REVIEW OF PLANT PHYSIOLOGY AND PLANT MOLECULAR BIOLOGY	12	7
PLANT BREEDING-ZEITSCHRIFT FUR PFLANZENZUCHTUNG	10	4
AUSTRALIAN JOURNAL OF DAIRY TECHNOLOGY	10	4
FASEB JOURNAL	9	4
AUSTRALIAN JOURNAL OF BIOLOGICAL SCIENCES	9	7
ANNALS OF BOTANY	8	6
JOURNAL OF NATURAL PRODUCTS-LLOYDIA	7	6
PLANTA	7	6
JOURNAL OF FOOD PROTECTION	6	3
AUSTRALIAN JOURNAL OF EXPERIMENTAL AGRICULTURE	6	5
JOURNAL OF DAIRY RESEARCH	6	4
PLANT CELL TISSUE AND ORGAN CULTURE	6	5
REPRODUCTION FERTILITY AND DEVELOPMENT	5	3
ANNUAL REVIEW OF PHYTOPATHOLOGY	5	2
AUSTRALIAN JOURNAL OF PLANT PHYSIOLOGY	5	4
SOIL SCIENCE SOCIETY OF AMERICA JOURNAL	4	2
JOURNAL OF THE SCIENCE OF FOOD AND AGRICULTURE	4	2
PHYTOPATHOLOGY	4	4
JOURNAL OF PLANT PHYSIOLOGY	4	3
PLANT CELL REPORTS	4	4
JOURNAL OF FOOD SCIENCE	3	2
ANNALS OF APPLIED BIOLOGY	3	1
FOOD CHEMISTRY	3	2
TRANSACTIONS OF THE ASAE	3	1
ANIMAL SCIENCE	3	1
JOURNAL OF CEREAL SCIENCE	3	3
MEAT SCIENCE	2	1
NEW PHYTOLOGIST	2	2
PLANT SCIENCE	2	1
JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY	2	1
INTERNATIONAL JOURNAL OF FOOD SCIENCE AND TECHNOLOGY	2	2
CRYOBIOLOGY	2	2
CROP SCIENCE	2	2
THERIOGENOLOGY	2	2
AUSTRALIAN JOURNAL OF BOTANY	2	1

Table 18. Top journals publishing Australian-authored chemistry papers cited in 1988—1997 U.S. patents (whole counts)

Journal	Cites	Cited papers
AUSTRALIAN JOURNAL OF CHEMISTRY	134	74
JOURNAL OF CHEMICAL SOCIETY	59	34
TETRAHEDRON LETTERS	52	26
JOURNAL OF THE AMERICAN CHEMICAL SOCIETY	42	17
JOURNAL OF ORGANIC CHEMISTRY	36	17
JOURNAL OF PHYSICAL CHEMISTRY	22	10
POLYMER BULLETIN	21	5
APPLIED CATALYSIS	16	12
JOURNAL OF MACROMOLECULAR SCIENCE	14	4
ANALYTICAL CHEMISTRY	12	8
TETRAHEDRON	10	8
CHEMICAL REVIEWS	10	2
COLLOIDS & SURFACES A	9	4
INORGANIC CHEMISTRY	9	7
SYNTHETIC COMMUNICATIONS	9	3
JOURNAL OF APPLIED POLYMER SCIENCE	8	3
ANALYTICA CHIMICA ACTA	8	7
APPLIED SPECTROSCOPY	8	5
JOURNAL OF COLLOID AND INTERFACE SCIENCE	7	6
JOURNAL OF HETEROCYCLIC CHEMISTRY	7	3
MACROMOLECULES	7	2
JOURNAL OF SOLID STATE CHEMISTRY	6	2
POLYMER COMPOSITES	6	1
INTERNATIONAL JOURNAL OF MINERAL PROCESSING	6	6
JOURNAL OF CATALYSIS	5	5
JOURNAL OF ELECTROANALYTICAL CHEMISTRY	5	5
POLYMER INTERNATIONAL	5	3
MACROMOLECULAR CHEMISTRY AND PHYSICS-MAKROMOLEKULARE CHEMIE	4	1
JOURNAL OF POWER SOURCES	4	3
POLYHEDRON	4	4
CHEMISTRY & INDUSTRY	4	1

Table 19. Top journals publishing Australian-authored engineering & technology papers cited in 1988—1997 U.S. patents (whole counts)

Journal	Cites	Cited papers
ELECTRONICS LETTERS	36	27
TRANSACTIONS OF THE IEEE	32	19
IEEE JOURNAL ON SELECTED AREAS IN COMMUNICATIONS	13	7
SOLAR ENERGY	10	4
JOURNAL OF THE AMERICAN CERAMIC SOCIETY	9	7
JOURNAL OF MATERIALS SCIENCE	9	8
IEEE TRANSACTIONS ON COMPUTERS	7	3
TAPPI JOURNAL	7	3
METALLURGICAL TRANSACTIONS	6	6
COMPUTER VISION GRAPHICS AND IMAGE PROCESSING	6	4
FUEL	5	3
HOLZFORSCHUNG	5	3
WEAR	5	4
IEEE COMPUTER GRAPHICS AND APPLICATIONS	5	2
IEEE ELECTRON DEVICE LETTERS	5	3
IEEE COMMUNICATIONS MAGAZINE	4	1
ENERGY & FUELS	3	2
AMERICAN INSTITUTE OF CHEMICAL ENGINEERS JOURNAL	3	1
PROCEEDINGS OF THE INSTITUTION OF ELECTRICAL ENGINEERS-LONDON	3	3
ACTA MATERIALIA	3	2
IEEE TRANSACTIONS ON INFORMATION THEORY	3	3
JOURNAL OF ALLOYS AND COMPOUNDS	3	2
IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE	2	1
CEMENT AND CONCRETE RESEARCH	2	1
JOURNAL OF MATERIALS SCIENCE LETTERS	2	2
IEEE MICRO	2	1
POWDER TECHNOLOGY	2	2
COMMUNICATIONS OF THE ACM	2	1
COMBUSTION SCIENCE AND TECHNOLOGY	2	1
SCR MATER	2	1
JOURNAL OF PARALLEL AND DISTRIBUTED COMPUTING	2	2
SURFACE & COATINGS TECHNOLOGY	2	1
JOURNAL OF THE SOCIETY OF DYERS AND COLOURISTS	2	2
HYDROMETALLURGY	2	2
SMPTE JOURNAL-SOCIETY OF MOTION PICTURE AND TELEVISION ENGINEERS	2	2

Table 20. Top journals publishing Australian-authored physics papers cited in 1988—1997 U.S. patents (whole counts)

Journal	Cites	Cited papers
TRANSACTIONS OF THE IEEE	23	15
JOURNAL OF MAGNETIC RESONANCE	20	11
JOURNAL OF VACUUM SCIENCE & TECHNOLOGY	19	10
JOURNAL OF PHYSICS	19	11
APPLIED PHYSICS LETTERS	17	13
OPTICS COMMUNICATIONS	14	6
APPLIED OPTICS	13	9
IEEE TRANSACTIONS ON SIGNAL PROCESSING	13	4
JOURNAL OF LIGHTWAVE TECHNOLOGY	12	8
SOLAR ENERG MATER SOLAR CELLS	11	9
JOURNAL OF APPLIED PHYSICS	10	8
REVIEW OF SCIENTIFIC INSTRUMENTS	9	5
JOURNAL OF MODERN OPTICS	9	7
JOURNAL OF THE OPTICAL SOCIETY OF AMERICA	8	5
INFRARED PHYS TECHNOL	6	2
OPTICS LETTERS	6	5
THIN SOLID FILMS	5	2
NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH	5	3
PHYSICA	4	4
PHYSICAL REVIEW LETTERS	3	3
PHILOSOPHICAL MAGAZINE LETTERS	2	1
OPTICAL AND QUANTUM ELECTRONICS	2	2
OPTICAL ENGINEERING	2	2
PLASMA PHYSICS AND CONTROLLED FUSION	2	1
PHYSICAL REVIEW	2	2
JOURNAL OF QUANTITATIVE SPECTROSCOPY & RADIATIVE TRANSFER	2	2
JOURNAL OF OPTICS-NOUVELLE REVUE D OPTIQUE	2	1
SOLID STATE COMMUNICATIONS	2	2
IEEE JOURNAL OF QUANTUM ELECTRONICS	2	2
SUPERCONDUCTOR SCIENCE & TECHNOLOGY	2	2
IEEE TRANSACTIONS ON SONICS AND ULTRASONICS	2	1
JOURNAL OF FLUID MECHANICS	2	2
JOURNAL OF CHEMICAL SOCIETY	2	1
VACUUM	2	1

Table 21. Numbers of citations and cited papers in all fields for top Australian author institutions cited in 1988—1997 U.S. patents (whole counts)

To all papers	Citations	Cited papers
CSIRO	1069	465
WALTER & ELIZA HALL INST MED RES	775	262
UNIV MELBOURNE	627	308
AUSTRALIAN NATL UNIV	624	287
UNIV ADELAIDE	403	147
MONASH UNIV	372	217
UNIV SYDNEY	326	197
UNIV NEW S WALES	280	181
UNIV WESTERN AUSTRALIA	226	88
CSL LTD	220	48
LUDWIG INST CANC RES	215	89
UNIV QUEENSLAND	200	121
ROYAL PRINCE ALFRED HOSP	191	68
S AUSTRALIAN GOVERNMENT	153	60
ROYAL PERTH HOSP	134	28
LA TROBE UNIV	125	57
AUSTRALIAN GOVT	120	82
FLINDERS UNIV S AUSTRALIA	115	70
HOWARD FLOREY INST	112	36
PRINCE HENRYS INST MED RES	99	42
AMALG MELB & ESS HOSPS	70	31
FAIRFIELD HOSP COMMUNICABLE DIS	68	32
MACQUARIE UNIV	61	37
ROYAL CHILDRENS HOSP MELBOURNE	61	31
QUEENSLAND INST MED RES	58	38
ROYAL N SHORE HOSP	58	31
PETER MACCALLUM CANC INST	57	37
ADELAIDE MED CTR WOMEN & CHILDREN	56	38
GARVAN INST MED RES	55	31
GRIFFITH UNIV	49	32
PRINCESS MARGARET HOSP CHILDREN	47	20
MURDOCH INST RES BIRTH DEFECTS LTD	44	17
WESTMEAD HOSP & MED CTR	44	23
UNIV NEWCASTLE	44	29

Table 22. Cites from all patents to Australian science, by sector

Sector of paper's author institution	Citations received (fractional count)	Percentage of citations received
University	2891	45.5
Medical Research Ctr (univ affil)	1140	18.0
CSIRO	917	14.4
Hospital (govt/univ affil)	530	8.4
Private Entity	335	5.3
Government	307	4.8
Hospital (govt/no univ affil)	218	3.4
Medical Research Ctr (no univ affil)	5	0
Hospital (pvt/Univ affil)	3	0
Hospital (pvt/no univ affil)	2	0
Total	**6348**	

Table 23. Numbers of citations and cited papers in biomedicine for top Australian author institutions cited in 1988—1997 U.S. patents (whole counts)

To all papers	Citations	Cited papers
WALTER & ELIZA HALL INST MED RES	771	260
CSIRO	727	271
UNIV MELBOURNE	539	245
AUSTRALIAN NATL UNIV	415	167
UNIV ADELAIDE	347	117
MONASH UNIV	294	169
UNIV SYDNEY	252	144
LUDWIG INST CANC RES	214	88
CSL LTD	211	42
ROYAL PRINCE ALFRED HOSP	191	68
UNIV WESTERN AUSTRALIA	168	55
UNIV QUEENSLAND	167	94
S AUSTRALIAN GOVERNMENT	148	56
ROYAL PERTH HOSP	134	28
UNIV NEW S WALES	131	75
HOWARD FLOREY INST	105	34
LA TROBE UNIV	102	43
FLINDERS UNIV S AUSTRALIA	97	58
PRINCE HENRYS INST MED RES	94	40
AMALG MELB & ESS HOSPS	70	31
FAIRFIELD HOSP COMMUNICABLE DIS	68	32
ROYAL CHILDRENS HOSP MELBOURNE	59	30
ROYAL N SHORE HOSP	58	31
QUEENSLAND INST MED RES	58	38
ADELAIDE MED CTR WOMEN & CHILDREN	56	38
PETER MACCALLUM CANC INST	55	36
GARVAN INST MED RES	55	31
PRINCESS MARGARET HOSP CHILDREN	47	20
MURDOCH INST RES BIRTH DEFECTS LTD	44	17
WESTMEAD HOSP & MED CTR	44	23

Table 24. Numbers of citations and cited papers in biology for top Australian author institutions cited in 1988—1997 U.S. patents (whole counts)

To all papers	Citations	Cited papers
CSIRO	79	45
UNIV MELBOURNE	23	17
AUSTRALIAN NATL UNIV	22	16
VICTORIAN GOVERNMENT	14	10
NEW S WALES GOVERNMENT	14	8
MONASH UNIV	13	5
WESTERN AUSTRALIAN GOVERNMENT	12	4
UNIV WESTERN AUSTRALIA	10	5
QUEENSLAND GOVERNMENT	8	4
LA TROBE UNIV	7	5
UNIV QUEENSLAND	6	6
UNIV SYDNEY	6	6
UNIV NEW S WALES	6	6
UNIV ADELAIDE	6	6
S AUSTRALIAN GOVERNMENT	5	4
PRINCE HENRYS INST MED RES	5	2
MACQUARIE UNIV	5	4
WALTER & ELIZA HALL INST MED RES	4	2
CARLSBERG BIOTECHNOL LTD	4	1
BIOTECH AUSTRALIA PTY LTD	3	2
UNIV WOLLONGONG	2	1
UNIV NEW ENGLAND	2	2
AB TECHNOL PTY LTD	1	1
UNIV TASMANIA	1	1
ROCHE RES INST MARINE PHARMACOL	1	1
MURDOCH UNIV	1	1
MARLESTON COLL TAFE	1	1
AUSTRALIAN WINE RES INST	1	1
LUDWIG INST CANC RES	1	1
JAMES COOK UNIV N QLD	1	1
GRIFFITH UNIV	1	1
EPWORTH HOSP	1	1
CP VENTURES LTD	1	1
UNIV WESTERN SYDNEY	1	1
SHELL PETR CO LTD	1	1

Table 25. Numbers of citations and cited papers in chemistry for top Australian author institutions cited in 1988—1997 U.S. patents (whole counts)

To all papers	Citations	Cited papers
CSIRO	139	64
AUSTRALIAN NATL UNIV	122	61
UNIV NEW S WALES	55	36
MONASH UNIV	52	31
UNIV MELBOURNE	49	32
UNIV ADELAIDE	44	21
UNIV WESTERN AUSTRALIA	37	20
UNIV SYDNEY	27	17
AUSTRALIAN GOVT	15	12
UNIV WOLLONGONG	14	7
LA TROBE UNIV	14	7
FLINDERS UNIV S AUSTRALIA	14	10
GRIFFITH UNIV	13	11
DEAKIN UNIV	10	9
UNIV QUEENSLAND	10	9
CSL LTD	9	6
UNIV NEWCASTLE	9	6
EASTMAN KODAK CO	8	2
MACQUARIE UNIV	8	8
HOWARD FLOREY INST	7	2
BROKEN HILL PROPRIETARY CO LTD	7	4
UNIV NEW ENGLAND	6	4
JAMES COOK UNIV N QLD	5	4
UNIV TASMANIA	5	2
ROCHE RES INST MARINE PHARMACOL	4	2
IMPERIAL CHEMICAL IND PLC	3	3
QUEENSLAND UNIV TECHNOL	3	2
CTR INFORMAT TECHNOL & COMMUN	2	1
PETER MACCALLUM CANC INST	2	1
SWINBURNE UNIV TECHNOL	1	1
UNIV TECHNOL SYDNEY	1	1
NEW S WALES GOVERNMENT	1	1
PRINCE WALES & PRINCE HENRY HOSP GRP	1	1
CURTIN UNIV TECHNOL	1	1
BAXTER CTR MED RES	1	1

Table 26. Numbers of citations and cited papers in engineering & technology for top Australian author institutions cited in 1988—1997 U.S. patents (whole counts)

To all papers	Citations	Cited papers
CSIRO	61	39
UNIV NEW S WALES	31	22
AUSTRALIAN GOVT	29	21
AUSTRALIAN NATL UNIV	19	13
UNIV SYDNEY	13	12
MONASH UNIV	11	10
UNIV MELBOURNE	10	8
ROYAL MELBOURNE INST TECHNOL	8	6
VICTORIA UNIV TECHNOL	7	1
UNIV WESTERN AUSTRALIA	7	5
UNIV QUEENSLAND	6	4
UNIV NEWCASTLE	6	5
MACQUARIE UNIV	6	2
BROKEN HILL PROPRIETARY CO LTD	6	6
UNIV S AUSTRALIA	4	3
UNIV TASMANIA	3	2
CISCO SYST INC	3	1
CRA LTD	2	1
CURTIN UNIV TECHNOL	2	1
TELSTRA	2	1
UNIV TECHNOL SYDNEY	2	1
UNIV CANBERRA	2	2
UNIV WOLLONGONG	2	2
SWINBURNE UNIV TECHNOL	1	1
FLINDERS UNIV S AUSTRALIA	1	1
DINDIMA GRP PTY LTD	1	1
RENISON GOLDFIELDS CONSOLIDATED LTD	1	1
MURDOCH UNIV	1	1
UNIV ADELAIDE	1	1
COMP SCI AUSTRALIA PTY LTD	1	1
COLORFILM PTY LTD	1	1
LA TROBE UNIV	1	1
BUNNINGS LTD	1	1

Table 27. Numbers of citations and cited papers in physics for top Australian author institutions cited in 1988—1997 U.S. patents (whole counts)

To all papers	Citations	Cited papers
UNIV NEW S WALES	54	41
CSIRO	50	36
AUSTRALIAN GOVT	45	28
AUSTRALIAN NATL UNIV	45	29
UNIV SYDNEY	28	18
GRIFFITH UNIV	18	9
ROYAL MELBOURNE INST TECHNOL	14	3
MACQUARIE UNIV	6	5
UNIV MELBOURNE	5	5
UNIV QUEENSLAND	4	3
UNIV WESTERN AUSTRALIA	4	3
FLINDERS UNIV S AUSTRALIA	3	1
JAMES COOK UNIV N QLD	2	2
ULTRASON INST	2	1
UNIV TECHNOL SYDNEY	2	2
VICTORIA UNIV TECHNOL	2	2
LA TROBE UNIV	1	1
UNIV ADELAIDE	1	1
UNIV NEWCASTLE	1	1
WBM STALKER PTY LTD	1	1
UNIV TASMANIA	1	1
UNIV WOLLONGONG	1	1
MONASH UNIV	1	1

Table 28. Top assignees of 1988—1997 U.S. patents citing Australian papers (whole counts)

Assignee	Number of citations	Number of patents	Number of papers
Roche Holding Ltd	351	129	188
American Home Products Corp	144	64	77
Chiron Corp	141	44	60
University of California	110	65	79
UNIV MELBOURNE	84	21	47
Commonwealth of Australia	83	28	74
University of Texas	82	66	47
US Dept Health & Human Services	72	55	67
General Hospital Corp, The	67	32	46
Glaxo Wellcome PLC	64	38	28
Novartis AG	59	42	34
Hoechst AG	55	42	46
Eli Lilly and Co	52	38	31
Lubrizol Corp	51	22	37
RIBOZYME PHARMACEUTICALS INC	51	23	5
E I DuPont de Nemours & Co	51	40	36
Merck & Co Inc	49	34	28
Schering-Plough Corp	49	29	29
Monsanto Co	49	36	20
AMRAD CORP. LTD.	46	12	31
GENE SHEARS PTY. LTD.	45	5	11
MIT/Mass Inst of Technology	45	41	25
University of Minnesota	42	22	25
Amgen Inc.	41	15	21
CENTRAL SYDNEY AREA HEALTH SERVICE	41	4	24
BIOTECHNOLOGY AUSTRALIA PTY. LTD.	40	7	26
MONASH UNIV.	37	4	23
MONASH MEDICAL CENTRE	37	4	23
ST. VINCENTS INST. OF MEDICAL RESEARCH	37	4	23
Xerox Corporation	37	12	19

Table 29. Top assignees of 1988–1997 U.S. patents citing Australian biomedical papers (whole counts)

Assignee	Number of cites	Number of patents	Number of papers
Roche Holding Ltd	340	122	182
Chiron Corp	139	42	59
American Home Products Corp	137	57	73
University of California	94	52	66
UNIV MELBOURNE	83	21	46
US Dept Health & Human Services	68	52	64
General Hospital Corp, The	65	30	44
Commonwealth of Australia	63	17	55
Glaxo Wellcome PLC	59	35	25
University of Texas	58	43	40
RIBOZYME PHARMACEUTICALS INC	51	23	5
Schering-Plough Corp	49	29	29
AMRAD CORP. LTD.	46	12	31
Hoechst AG	45	34	36
GENE SHEARS PTY. LTD.	45	5	11
Merck & Co Inc	44	29	24
Eli Lilly and Co	42	28	27
Amgen Inc.	41	15	21
CENTRAL SYDNEY AREA HEALTH SERVICE	41	4	24
Novartis AG	41	31	26
BIOTECHNOLOGY AUSTRALIA PTY. LTD.	39	6	25
ST. VINCENTS INST. OF MEDICAL RESEARCH	37	4	23
MONASH MEDICAL CENTRE	37	4	23
MONASH UNIV.	37	4	23
Monsanto Co	37	25	15
Lubrizol Corp	36	17	23
AUTOIMMUNE INC	34	8	10
GROPEP PTY LTD.	34	6	16
VIROGENETICS CORP.	33	7	20
CELTRIX PHARMACEUTICALS, INC.	32	9	12
MIT/Mass Inst ofTechnology	32	29	14
E I DuPont de Nemours & Co	32	23	24

Table 30. Top assignees of 1988—1997 U.S. patents citing Australian biology papers (whole counts)

Assignee	Number of citations	Number of patents	Number of papers
Lubrizol Corp	15	7	14
Pioneer Hi-Bred Int'l, Inc.	11	8	7
Novartis AG	10	10	2
Commonwealth of Australia	8	6	7
US Dept of Agriculture	8	6	8
Roche Holding Ltd	7	7	4
Monsanto Co	7	7	3
AQUILA BIOPHARMACEUTICALS INC.	6	6	1
University of California	5	5	3
Iowa State University	4	2	2
Johnson & Johnson	4	4	1
Weyerhaeuser Company	4	4	1
UOP Inc	3	3	2
Cornell University	3	3	2
FLORIGENE EUROPE B.V.	3	2	3
E I DuPont de Nemours & Co	3	3	2
Rhone Poulenc SA	3	3	1
SUN-MAID GROWERS OF CALIFORNIA	3	3	1
Baylor College of Medicine	3	3	1
BARNETT BANK OF POLK COUNTY	3	3	1
Michigan State University	3	2	2
National Research Council of Canada	3	2	3

Table 31. Top assignees of 1988—1997 U.S. patents citing Australian chemistry papers (whole counts)

Assignee	Number of citations	Number of patents	Number of papers
Xerox Corporation	33	8	16
HAWAII AGRICULTURE RESEARCH CENTER	28	7	4
Alusuisse-Lonza Holding AG	18	6	3
University of Texas	18	18	3
University of Nebraska	16	7	3
PHARMACYCLICS INC	15	15	1
E I DuPont de Nemours & Co	14	14	8
Kimberly-Clark Corporation	10	10	2
Eli Lilly and Co	9	9	3
Mobil Corporation	9	8	5
Dow Chemical Co	9	8	5
Novartis AG	8	8	6
US DOE	8	8	8
Imperial Chemical Industries PLC	7	4	5
Research Corporation Technologies	7	7	2
Hoechst AG	7	7	7
Virginia Polytechnic Institute and State Univ	7	3	6
Suntory Ltd	7	6	4
Unisearch Limited	6	2	6
Sumitomo Chemical Co Ltd	6	6	2
State Univ of New York	6	5	6
American Home Products Corp	6	6	3
BP AMOCO Plc.	6	5	4
University of British Columbia	6	5	5
University of California	6	6	5
ANDERSEN CORP.	6	6	1
Nycomed Amersham PLC	5	4	5
Pharmacia & Upjohn	5	5	3
HARBOR BRANCH OCEANOGRAPHIC INST. INC.	5	5	3
Glaxo Wellcome PLC	5	3	3
Bayer AG	5	5	4
Nissan Chemical Industries Ltd	5	3	2
Monsanto Co	5	5	2
BASF Group	5	5	5
University of Pennsylvania	5	3	2

Table 32. Top assignees of 1988—1997 U.S. patents citing Australian engineering & technology papers (whole counts)

Assignee	Number of citations	Number of patents	Number of papers
Lucent Technologies	7	7	5
Omnipoint Corp.	7	7	1
MIT/Mass Inst of Technology	6	5	5
Philips Electronics N.V.	6	6	5
IBM	6	6	5
Corning Inc	5	4	4
Toshiba Corporation	5	5	5
ANTENNA DOWNLINK, INC.	5	3	2
PULP & PAPER RESEARCH INST. OF CANADA	4	4	1
ILLINOIS SUPERCONDUCTOR CORP.	4	2	2
General Electric Co	4	4	3
NEC Corporation	3	3	3
Praxair Inc	3	3	1
ASHURST TECHNOLOGY CORP (IRELAND LTD)	3	2	2
Ericsson (LM) Telephone Co Inc	3	3	3
Commonwealth of Australia	3	3	3

Table 33. Top assignees of 1988—1997 U.S. patents citing Australian physics papers (whole counts)

Assignee	Number of citations	Number of patents	Number of papers
University of Minnesota	14	4	6
Texas Instruments Incorporated	10	5	6
Lucent Technologies	8	8	7
Rockwell International Corp	8	8	3
Commonwealth of Australia	8	3	8
University of Texas	6	5	4
Toshiba Corporation	6	6	5
Fujitsu Limited	6	6	4
Stanford University	5	5	3
US DOE	5	3	5
Mitsubishi Electric Corp	4	4	2
DOLBY LABS LICENSING CORP.	4	4	1
Raytheon Company	4	4	4
Thomson SA	4	3	3
MOLECULAR IMAGING CORP	4	4	1
MMM/Minnesota Mining & Mfg Co	4	4	3
Sanyo Electric Co Ltd	4	4	3
Hitachi Ltd	4	4	2
Sumitomo Electric Industries Ltd	4	4	3
DYUAR INC.	4	2	2
Hewlett-Packard Company	3	3	3
IBM	3	3	3
MIT/Mass Inst of Technology	3	3	3
Mobil Corporation	3	3	3
Rhone Poulenc SA	3	3	2
Pilkington PLC	3	3	3
Max Planck Gesellschaft fur Forderung der Wissenschaften EV	3	3	3
Alcatel Alsthom Cie Generale d'Electricite	3	3	1
University of California	3	3	3

Table 34. Top assignees of 1988—1997 Australian-invented U.S. patents citing Australian papers (whole counts)

Assignee	Number of citations	Number of patents	Number of papers
UNIV MELBOURNE	84	21	47
Commonwealth of Australia	83	28	74
GENE SHEARS PTY. LTD.	45	5	11
CENTRAL SYDNEY AREA HEALTH SERVICE	41	4	24
AMRAD CORP. LTD.	40	11	26
BIOTECHNOLOGY AUSTRALIA PTY. LTD.	40	7	26
Roche Holding Ltd	40	5	21
ST. VINCENTS INST. OF MEDICAL RESEARCH	37	4	23
MONASH MEDICAL CENTRE	37	4	23
MONASH UNIV.	37	4	23
Lubrizol Corp	36	11	30
GROPEP PTY LTD.	34	6	16
UNIV SYDNEY	24	5	24
NEW ZEALAND MINISTRY OF AGRIC. & FISHERIES	15	5	7
HOWARD FLOREY INST. OF EXPERIMENTAL PHYS'LOGY	15	7	5
ELECTROSCAN CORP.	11	6	2
Ludwig Institute for Cancer Research	9	3	6
Unisearch Limited	8	3	8
UNIV QUEENSLAND	8	4	8
Dow Chemical Co	8	2	8
GRIFFITH UNIV.	8	2	8
Schering-Plough Corp	8	3	5
PETER MACCALLUM INSTITUTE	7	1	7
AUSTRALIAN NAT'L UNIV., THE	7	4	5
ANTI-CANCER COUNCIL OF VICTORIA	7	1	7
Mallinckrodt Group, Inc.	7	2	5
LUMINIS PTY. LTD.	6	4	6
PEPTIDE TECHNOLOGY LTD	5	1	5
AVITECH DIAGNOSTICS INC	5	1	5
US Dept Health & Human Services	5	3	5
BIOTECH AUSTRALIA PTY LTD	5	3	5
UNIV ALBERTA, GOVERNORS OF	5	1	5

Table 35. Top assignees of 1988—1997 Australian-invented U.S. patents citing Australian biomedical papers (whole counts)

Assignee	Number of citations	Number of patents	Number of papers
UNIV MELBOURNE	83	21	46
Commonwealth of Australia	63	17	55
GENE SHEARS PTY. LTD.	45	5	11
CENTRAL SYDNEY AREA HEALTH SERVICE	41	4	24
Roche Holding Ltd	40	5	21
AMRAD CORP. LTD.	40	11	26
BIOTECHNOLOGY AUSTRALIA PTY. LTD.	39	6	25
MONASH MEDICAL CENTRE	37	4	23
ST. VINCENTS INST. OF MEDICAL RESEARCH	37	4	23
MONASH UNIV.	37	4	23
GROPEP PTY LTD.	34	6	16
Lubrizol Corp	25	10	19
UNIV SYDNEY	22	3	22
HOWARD FLOREY INST. OF EXPERIMENTAL PHYS'LOGY	15	7	5
NEW ZEALAND MINISTRY OF AGRIC. & FISHERIES	15	5	7
ELECTROSCAN CORP.	11	6	2
Ludwig Institute for Cancer Research	9	3	6
Schering-Plough Corp	8	3	5
Dow Chemical Co	8	2	8
UNIV QUEENSLAND	8	4	8
Mallinckrodt Group, Inc.	7	2	5
AUSTRALIAN NAT'L UNIV., THE	7	4	5
GRIFFITH UNIV.	7	2	7
ANTI-CANCER COUNCIL OF VICTORIA	6	1	6
PETER MACCALLUM INSTITUTE	6	1	6
US Dept Health & Human Services	5	3	5
PEPTIDE TECHNOLOGY LTD	5	1	5
BIOTECH AUSTRALIA PTY LTD	5	3	5
AVITECH DIAGNOSTICS INC	5	1	5
UNIV ALBERTA, GOVERNORS OF	5	1	5

Table 36. Top assignees of 1988—1997 Australian-invented U.S. patents citing Australian biology, engineering & technology, chemistry, and physics papers (whole counts)

Assignee	Number of cites	Number of patents	Number of papers
Biology			
Lubrizol Corp	11	3	11
Commonwealth of Australia	8	6	7
COOPERATIVE RESEARCH CTR(INDUST.PLANT BIOPOLYM	2	1	2
BIO POLYMERS PTY. LTD.	2	2	2
BIOTECHNOLOGY AUSTRALIA PTY. LTD.	1	1	1
LUMINIS PTY. LTD.	1	1	1
SOUTHERN CROSS BIOTECH PTY.LTD.	1	1	1
Unilever NV	1	1	1
Engineering & technology			
Commonwealth of Australia	3	3	3
BOC Group PLC, The	1	1	1
CEA/Comm a L'Energie Atomique	1	1	1
Chemistry			
Unisearch Limited	6	2	6
Imperial Chemical Industries PLC	2	1	2
ELECTRO-MAGIC, INC.	2	1	2
UNIV SYDNEY	1	1	1
GRIFFITH UNIV.	1	1	1
LUMINIS PTY. LTD.	1	1	1
PETER MACCALLUM INSTITUTE	1	1	1
Rhone Poulenc SA	1	1	1
Commonwealth of Australia	1	1	1
CARLBIOTECH LTD. A/S	1	1	1
UNIV MELBOURNE	1	1	1
ANTI-CANCER COUNCIL OF VICTORIA	1	1	1
HALLSWORTH & ASSOCIATES PTY. LTD.	1	1	1
GLYZINIC PHARMACEUTICALS LIMITED	1	1	1
Physics			
Commonwealth of Australia	8	3	8
COLLOIDAL DYNAMICS	2	1	2
MATEC APPLIED SCIENCES, INC.	2	1	2
Unisearch Limited	2	1	2
UNIV SYDNEY	1	1	1
AUSTRALIAN TELECOMMUNICATION CORP.	1	1	1
BELL-IRH LTD.	1	1	1

Table 37. Top funding organisations acknowledged in Australian-authored papers cited in 1988—1997 U.S. patents (whole counts)

Funding source (General' means Others not listed individually)	Cited papers
NHMRC (National Health Med. Res. Council)	841
Australian Government (all levels) (General)	394
ARC (Australian Research Council)	266
Foreign Gov't and Non-Profit (non-AU, non-US)	174
Australian Universities (General)	153
Private for-profit institutions (all countries) (General)	148
Australian Foundations (General)	134
Victoria Anti-Cancer Council	116
National Cancer Institute (US)	101
All other U.S. private non-profit institutions	72
Australian R & D Corporations (General)	70
Australian Funds (General)	62
Nat'l Institute Allergy & Infectious Disease (US)	61
Australian Trusts (General)	60
Australian Non-profits (not sure if foundations/trusts/charities)(General)	59
United Nations & other Supra-National Organizations	53
Australian Hospitals (General)	49
National Heart Foundation (AU)	37
Rockefeller Foundation (US)	35
Australian Natl. Biotechnology program grants scheme	33
CSIRO (Commonwealth Sci. & Indust. Res. Org.)	28
National Heart, Lung, & Blood Institute (US)	26
National Institutes of Health (US) (unspecified)	26
Nat'l Institute of General Medical Sciences (US)	24
Queensland Cancer Fund	24
Anti-Cancer Foundation of the Universities of Southern Australia	22
Nat'l Science Foundation (US)	21
AMRAD Corp.	18
American Heart Assn. (incl. all State & Local Branches)	18
Lions Charities Australian	17
Clive & Vera Ramaciotti Foundation	16
Foreign Universities (non-AU, non-US)	16
J.D. & L. Harris Cancer Fund	16
Ian Potter Foundation	16
National Institute of Child Health & Human Development (US)	15
Royal Perth Hospital Research Foundation	15

Table 38. Top funding organisations acknowledged in Australian-authored biomedical papers cited in 1988—1997 U.S. patents (whole counts)

Funding source (General' means Others, not listed individually)	Cited papers
NHMRC (National Health Med. Res. Council)	827
Australian Government (all levels) (General)	258
Foreign Gov't and Non-Profit (non-AU, non-US)	135
ARC (Australian Research Council)	127
Australian Foundations (General)	126
Private for-profit institutions (all countries) (General)	123
Victoria Anti-Cancer Council	114
Australian Universities (General)	104
National Cancer Institute (US)	99
All other U.S. private non-profit institutions	67
Nat'l Institute Allergy & Infectious Disease (US)	61
Australian Trusts (General)	57
Australian Funds (General)	56
Australian Non-profits (not sure if foundations/trusts/charities)(General)	53
United Nations & other Supra-National Organizations	51
Australian Hospitals (General)	49
Australian R & D Corporations (General)	45
National Heart Foundation (AU)	36
Rockefeller Foundation (US)	35
Australian Natl. Biotechnology program grants scheme	32
National Institutes of Health (US) (unspecified)	25
National Heart, Lung, & Blood Institute (US)	23
Queensland Cancer Fund	22
Anti-Cancer Foundation of the Universities of Southern Australia	22
Nat'l Institute of General Medical Sciences (US)	21
AMRAD Corp.	18
American Heart Assn. (incl. all State & Local Branches)	17
CSIRO (Commonwealth Sci. & Indust. Res. Org.)	17
Lions Charities Australian	17
J.D. & L. Harris Cancer Fund	16
Ian Potter Foundation	16
Clive & Vera Ramaciotti Foundation	16
National Institute of Child Health & Human Development (US)	15
Royal Perth Hospital Research Foundation	15

Table 39. Top funding organisations acknowledged in Australian-authored biology papers cited in 1988—1997 U.S. patents (whole counts)

Funding source (General' means Others, not listed individually)	Cited papers
Australian Government (all levels) (General)	25
ARC (Australian Research Council)	15
Foreign Gov't and Non-Profit (non-AU, non-US)	9
Australian Universities (General)	8
Private for-profit institutions (all countries) (General)	6
NHMRC (National Health Med. Res. Council)	6
Australian R & D Corporations (General)	5
Australian Funds (General)	4
Australian Trusts (General)	3
CSIRO (Commonwealth Sci. & Indust. Res. Org.)	2
Dept. of Agriculture (US)	2
Australian Foundations (General)	2
All other U.S. private non-profit institutions	2
National Cancer Institute (US)	2
Foreign Universities (non-AU, non-US)	1
State or Local Gov't (US)	1
U.S. Universities and Medical Schools (state funded) (General)	1
Victoria Anti-Cancer Council	1
Australian Natl. Biotechnology program grants scheme	1
Australian Multiple-Sclerosis Society	1
Australian Charities (General)	1
Arthritis Foundation (US)	1
Nat'l Science Foundation (US)	1

Table 40. Top funding organisations acknowledged in Australian-authored chemistry papers cited in 1988–1997 U.S. patents (whole counts)

Funding source ('General' means 'Others, not listed individually')	Cited papers
ARC (Australian Research Council)	85
Australian Government (all levels) (General)	52
Australian Universities (General)	23
Foreign Gov't and Non-Profit (non-AU, non-US)	17
Australian R & D Corporations (General)	7
NHMRC (National Health Med. Res. Council)	6
Private for-profit institutions (all countries) (General)	5
Nat'l Science Foundation (US)	4
Foreign Universities (non-AU, non-US)	4
Nat'l Institute of General Medical Sciences (US)	3
Australian Non-profits (not sure if foundations/trusts/charities)(General)	3
Univ. Monash Funds	3
CSIRO (Commonwealth Sci. & Indust. Res. Org.)	3
Australian Foundations (General)	3
Army (US)	3
Dept. of Energy (US)	2
All other U.S. private non-profit institutions	2
Australian Funds (General)	2
Navy (US)	1
National Institutes of Health (US) (unspecified)	1
National Heart, Lung, & Blood Institute (US)	1
Victoria Anti-Cancer Council	1
United Nations & other Supra-National Organizations	1

Table 41. Top funding organisations acknowledged in Australian-authored engineering & technology papers cited in 1988—1997 U.S. patents (whole counts)

Funding source (General' means Others, not listed individually)	Cited papers
Australian Government (all levels) (General)	22
ARC (Australian Research Council)	18
Private for-profit institutions (all countries) (General)	8
Australian Universities (General)	7
Foreign Gov't and Non-Profit (non-AU, non-US)	6
Australian R & D Corporations (General)	5
Foreign Universities (non-AU, non-US)	5
Dept. of Energy (US)	3
Nat'l Aeronautics & Space Administration (US)	3
Navy (US)	2
Nat'l Science Foundation (US)	2
Army (US)	2
Univ. Monash Funds	2
Australian Foundations (General)	1
Australian Non-profits (not sure if foundations/trusts/charities)(General)	1
Air Force (US)	1
CSIRO (Commonwealth Sci. & Indust. Res. Org.)	1
U.S. Universities and Medical Schools (state funded) (General)	1
State or Local Gov't (US)	1
Advanced Research Projects Agency (US)	1

Table 42. Top funding organisations acknowledged in Australian-authored physics papers cited in 1988—1997 U.S. patents (whole counts)

Funding source ('General' means Others, 'not listed individually')	Cited papers
Australian Government (all levels) (General)	34
ARC (Australian Research Council)	20
Australian Universities (General)	10
Australian R & D Corporations (General)	8
Foreign Gov't and Non-Profit (non-AU, non-US)	7
Private for-profit institutions (all countries) (General)	5
Dept. of Energy (US)	3
Australian Non-profits (not sure if foundations/trusts/charities)(General)	2
All Other Federal Gov't (US)	2
Australian Foundations (General)	2
National Heart, Lung, & Blood Institute (US)	2
NHMRC (National Health Med. Res. Council)	2
Queensland Cancer Fund	2
Army (US)	1
Nat'l Aeronautics & Space Administration (US)	1
Nat'l Science Foundation (US)	1
National Heart Foundation (AU)	1
American Heart Assn. (incl. all State & Local Branches)	1
All other U.S. private non-profit institutions	1
United Nations & other Supra-National Organizations	1
U.S. Universities and Medical Schools (state funded) (General)	1
CSIRO (Commonwealth Sci. & Indust. Res. Org.)	1

Table 43. Whole count of author institutions for papers found in library search, with no funding acknowledgments

Unified institution	Whole count of papers
CSIRO	217
AUSTRALIAN NATL UNIV	133
MONASH UNIV	61
UNIV MELBOURNE	58
AUSTRALIAN GOVT	58
UNIV NEW S WALES	50
UNIV SYDNEY	45
LUDWIG INST CANC RES	44
UNIV ADELAIDE	34
WALTER & ELIZA HALL INST MED RES	31
CSL LTD	29
UNIV QUEENSLAND	28
UNIV WESTERN AUSTRALIA	26
FLINDERS UNIV S AUSTRALIA	25
ROYAL PRINCE ALFRED HOSP	20
LA TROBE UNIV	17
FAIRFIELD HOSP COMMUNICABLE DIS	17
AMALG MELB & ESS HOSPS	16
PETER MACCALLUM CANC INST	15
S AUSTRALIAN GOVERNMENT	14
MACQUARIE UNIV	14
WESTMEAD HOSP & MED CTR	13
ROYAL ADELAIDE HOSP	12
ROYAL CHILDRENS HOSP MELBOURNE	12
ROYAL MELBOURNE INST TECHNOL	10
ROYAL PERTH HOSP	10
VICTORIAN GOVERNMENT	9
NEW S WALES GOVERNMENT	9
QUEENSLAND INST MED RES	8
ADELAIDE MED CTR WOMEN & CHILDREN	7
ST VINCENTS HOSP SYDNEY	7
ALFRED GRP HOSPS	7
PRINCE HENRYS INST MED RES	7
UNIV WOLLONGONG	7
GRIFFITH UNIV	7
PRINCE HENRYS HOSP MELBOURNE	6
PRINCE WALES & PRINCE HENRY HOSP GRP	6
QUEEN ELIZABETH HOSP ADELAIDE	6
HOWARD FLOREY INST	6
ST VINCENTS HOSP MELBOURNE	5
ROYAL N SHORE HOSP	5
ULTRASON INST	5
UNIV NEWCASTLE	5
PRINCESS MARGARET HOSP CHILDREN	5
UNIV TASMANIA	5
BROKEN HILL PROPRIETARY CO LTD	5
ROCHE RES INST MARINE PHARMACOL	5
GARVAN INST MED RES	5
MURDOCH UNIV	4
MURDOCH INST RES BIRTH DEFECTS LTD	4
CHILD HLTH RES INST	4
UNIV NEW ENGLAND	4
ROYAL BRISBANE HOSP	4

Table 43. (cont'd) Whole count of author institutions for papers found in library search, with no funding acknowledgments

Unified institution	Whole count of papers
ST VINCENTS INST MED RES	4
UNIV TECHNOL SYDNEY	4
CANBERRA HOSP	3
BAKER MED RES INST	3
HEIDELBERG REPATRIAT HOSP	3
BIOTECH AUSTRALIA PTY LTD	3
VICTORIA UNIV TECHNOL	3
SIR CHARLES GAIRDNER HOSP	3
AUSTIN RES INST	3
CONCORD REPATRIAT GEN HOSP	3
ROYAL NEWCASTLE HOSP	3
QUEENSLAND GOVERNMENT	3
QUEEN VICTORIA MED CTR MELBOURNE	3
WESTERN AUSTRALIAN GOVERNMENT	3
CURTIN UNIV TECHNOL	2
SWINBURNE UNIV TECHNOL	2
HEART RES INST	2
UNIV S AUSTRALIA	2
CTR DIGEST DIS	2
EASTMAN KODAK CO	2
DEAKIN UNIV	2
GEELONG HOSP	2
FREMANTLE HOSP	2
CRA LTD	2
JAMES COOK UNIV N QLD	2
EPWORTH HOSP	2
BRISBANE MATER MISERICORDIAE HOSP	2
RP SCHERER INT CORP	2
IMPERIAL CHEMICAL IND PLC	2
PACIFIC BIOTECHNOL LTD	2
ROYAL HOSP WOMEN	2
AUSTIN HOSP	2
PRINCESS ALEXANDRA HOSP	2
ROYAL WOMENS HOSP MELBOURNE	2
QUEENSLAND UNIV TECHNOL	2
MONASH MED CTR	2
STREET ADDRESSES 1997	2
FH FAULDING & CO LTD	2
COMP SCI AUSTRALIA PTY LTD	1
COLORFILM PTY LTD	1
WESTERN GEN HOSP	1
CISCO SYST INC	1
CIBA GEIGY LTD	1
WESLEY HOSP	1
AMBROSE MED GRP	1
BAXTER CTR MED RES	1
CARLSBERG BIOTECHNOL LTD	1
CAMBRIDGE PRIVATE HOSP	1
WBM STALKER PTY LTD	1
BUNGE IND PTY LTD	1
AUSTRALIAN RED CROSS SOC	1
AUSTRALIAN WINE RES INST	1
BOX HILL HOSP	1

Table 43. (cont'd) Whole count of author institutions for papers found in library search, with no funding acknowledgments

Unified institution	Whole count of papers
BACTECH AUSTR PTY LTD	1
CHILDRENS MED RES INST	1
SYDNEY EYE HOSP	1
REGENCY PK CTR PHYSICALLY HANDICAPPED CHILDREN	1
ROYAL CANBERRA HOSP	1
ROYAL COLL PATHOLOGISTS AUSTRALASIA	1
ROYAL SOC PROTECT & CRUELTY ANIM	1
PRINCE CHARLES HOSP	1
NORTHWEST HOSP	1
NEWCASTLE MATER MISERICORDIAE HOSP	1
AB TECHNOL PTY LTD	1
ST GEORGE HOSP SYDNEY	1
ST JOHN GOD HOSP MELBOURNE	1
LEDERLE LABS	1
SUGAR RES LTD	1
ER SQUIBB & SONS PTY LTD	1
HANSON CTR CANC RES	1
CP VENTURES LTD	1
GREENSLOPES REPATRIAT GEN HOSP	1
GLADSTONE DIST HOSP	1
SYDNEY IVF PTY LTD	1
FOSTERS BREWING GROUP LTD	1
TOWNSVILLE GEN HOSP	1
ROYAL ALEXANDRA HOSP CHILDREN	1
TVW TELETHON INST CHILD HLTH RES	1
NEPEAN DIST HOSP	1
DR COLIN R LAVERTY GYNAECOL PATHOL	1
DINDIMA GRP PTY LTD	1
DELHI PETR PTY LTD	1
CSR LTD	1
UNIV CANBERRA	1
INST DRUG TECHNOL	1

Table 44. Top cited paper details, by field

Biology					
9 cites by patents	Article: INHIBITION OF FUNGI FROM WHEAT ROOTS BY PSEUDOMONAS FLUORESCENS 2-79 AND FUNGICIDES Journal SOII, BIOLOGY & BIOCHEMISTRY Vol: 0021 Pg: 1019 Year:1989 Cites by papers: 8 ISI loc. ZZDCY-				
Author(s)	Author institution(s)	Dept.	City	Country	Funding Source(s)
BRISBANE PG	CSIRO	DIV SOILS	GLEN OSMOND	AUSTRALIA	No funding Information Given
HARRIS JR					
MOEN R					
8 cites by patents	Article: STRUCTURE OF DESACYLSAPONINS OBTAINED FROM THE BARK OF QUILLAJA-SAPONARIA/ Journal PHYTOCHEMISTRY Vol: 0026 Pg. 0229 Year:1987 Cites by papers: 37 ISI loc. ZF8TTD				
Author(s)	Author institution(s)	Dept.	City	Country	Funding Source(s)
TOKIMITSU Y	KYUSHU UNIV	FAC PHARMACEUT SCI	FUKUOKA 812	JAPAN	Australian Govt (all levels) (General)
FUJIOKA T	CSIRO	DIV FOOD RES	N RYDE	AUSTRALIA	
KOMORI T					
KAWASAKI T					
OAKENFUL DG					
HIGUCHI R					
Biomedical					
63 cites by patents	Article: SIMPLE RNA ENZYMES WITH NEW AND HIGHLY SPECIFIC ENDORIBONUCLEASE ACTIVITIES/ Journal NATURE Vol: 0334 Pg: 0585 Year: 1988 Cites by papers: 597 ISI loc.: ZY8E-&				
Author(s)	Author institution(s)	Dept	City	Country	Funding Source(s)
HASELOFF J	CSIRO	DIV PLANT IND	CANBERRA	AUSTRALIA	Australian Government (all levels) (General)
GERLACH WL					
57 cites by patents	Article: USE OF PEPTIDE-SYNTHESIS TO PROBE VIRAL-ANTIGENS FOR EPITOPES TO A RESOLUTION OF A SINGLE AMINO-ACID/ Journal: PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA - BIOLOGICAL SCIENCES Vol: 0081 Pg: 3998 Year: 1984 Cites by papers: 761 ISI loc.: UGLEKD				
Author(s)	Author institution(s)	Dept	City	Country	Funding Source(s)
GEYSEN HM	COMMONWEALTH	45 POPLAR RD	PARKVILLE	AUSTRALIA	No Funding Information Given
MELOEN M	SERUM LABS				
BARTELING SJ	CENT VET INST		LELYSTAD	NETHERLANDS	

Table 44. (cont'd) Top cited paper details, by field

Chemistry					
16 cites by patents	Article: METAL-I0N PROMOTED PHOSPHATE ESTER HYDROLYSIS - INTRAMOLECULAR ATTACK OF COORDINATED HYDROXIDE ION/ Journal JOURNAL OF THE AMERICAN CHEMICAL SOCIETY Vol: 0111 Pg: 2521 Year: 1989 Cites by papers: 61 ISI loc.: ZZ-ITS				
Author(s)	Author institution(s)	Dept	City	Country	Funding Source(s)
SARGESON AM	AUSTRALIAN NATL UNIV	RES SCH CHEM	CANBERRA	AUSTRALIA	No Funding Information Given
HENDRY P					
9 cites by patents	Article: THE USE OF MODEL COMPOUNDS IN INTERPRETING THE THERMAL-DEGRADATION OF P0LY%METHYL METHACRYLATE< - EFFECT OF GROUPS PRODUCED DURING TERMINATION OF POLYMERIZATION/ Journal POLYMER BULLETIN Vol: 0011 Pg: 0325 Year: 1984 Cites by papers: 46 ISI loc.: T919.I				
Author(s)	Author institution(s)	Dept	City	Country	Funding Source(s)
CACIOLI P	CSIRO	DIV APPL ORGAN CHEM	MELBOURNE	AUSTRALIA	Paper Not Found
MOAD G					
RIZZARDO E					
SERELIS AK					
SOLOMON DH					
Engineering & Technology					
7 cites by patents	Article: F-QPSK - A SUPERIOR MODULATION TECHNIQUE FOR MOBILE AND PERSONAL COMMUNICATIONS/ Journal: IEEE TRANSACTIONS ON BROADCASTING Vol: 0039 Pg: 0288 Year: 1993 Cites by papers: 4 ISI loc.:Z0D*M,				
Author(s)	Author institution(s)	Dept	City	Country	Funding Source(s)
LEUNG PSK	VICTORIA UNIV TECHNOL	DEPT ELECT& ELECTR ENGN	MELBOURNE 3011	AUSTRALIA	U.S. Universities and Medical Schools (sta fund)
FEHER K	UNIV CALIF DAVIS	DEPT ELECT & COMP ENGN	DAVIS	US	(General) Nat'l Aeronautics & Space Administration (Private for-profit institutions (all countries) (General)
4 cites by patents	A REGULAR LAYOUT FOR PARALLEL ADDERS/ Journal IEEE TRANSACTIONS ON COMPUTERS Vol: 0031 Pg: 0260 Year: 1982 Cites by papers: 95 ISI loc.:PUIOZ4				
Author(s)	Author institution(s)	Dept	City	Country	Funding Source(s)
BRENT RP	AUSTRALIAN NATI. UNIV	DEPT COMP SCI	CANBERRA	AUSTRALIA	No Funding Information Given
KUNG HT	CARNEGIE MELLON UNIV	DEPT COMP SCI	PITTSBURGH	US	

Table 44. (cont'd) Top cited paper details, by field

Engineering & Technology (cont'd)					
4 cites by patents	Article: INPUT MISMATCH OF TE11 MODE COAXIAL WAVE-GUIDE FEEDS/ Journal IEEE TRANSACTIONS ON ANTENNAS AND PROPAGATION Vol: 0034 Pg: 1030 Year: 1986 Cites by papers: 3 ISI loc.: YUKHJ3				
Author(s)	Author institution(s)	Dept	City	Country	Funding Source(s)
BIRD TS JAMES GL SKINNER SJ	CSIRO	DIV RADIOPHYS	EPPING	AUSTRALIA	No Funding Information Given
Physics					
10 cites by patents	Article: ANALYSIS SYNTHESIS FILTER BANK DESIGN BASED ON TIME DOMAIN ALIASING CANCELLATION/ Journal: IEEE, TRANSACTIONS ON ACOUSTICS SPEECH AND SIGNAL PROCESSING Vol: 0034 Pg: 1153 Year: 1986 Cites by papers: 45 ISI loc.: Y1,24R				
Author(s) Author	institution(s)	Dept	City	Country	Funding Source(s)
PRINCEN JP BRADLEY AB	ROYAL MELBOURNE INST TECHNOL	DEPT COMMUN & ELECTR ENGN	MELBOURNE	AUSTRALIA	No Funding Information Given
6 cites by patents	Article: REAL-TIME IMAGE SUBTRACTION IN 4-WAVE MIXING WITH PHOTOREFRACTIVE B112GE020 CRYSTALS/ Journal OPTICS COMMUNICATIONS Vol: 0042 Pg: 0377 Year: 1982 Cites by papers: 15 ISI loc.: QUCKAV				
Author(s)	Author institution(s)	Dept	City	Country	Funding Source(s)
JA YH	TELECOM AUSTRALIA	RES LABS	CLAYTON	AUSTRALIA	No Funding Information Given
5 cites by patents	Article: USE OF MAGNETIC FORCES TO CONTROL DISTANCE IN A SURFACE FORCE APPARATUS/ Journal MEASUREMENT SCIENCE & TECHNOLOGY Vol: 0001 Pg: 1301 Year: 1990 Cites by papers: 18 ISI loc.: ZZQB2V				
Author(s)	Author institution(s)	Dept	City	Country	Funding Source(s)
STEWART AM CHRISTENSON HK	AUSTRALIAN NATL UNIV	RES SCH PHYS SCI	CANBERRA	AUSTRALIA	No Funding Information Given

Table 45. Top assignees of 1988—1997 Australian-invented U.S. patents citing science papers

Assignee	Number of patents (fractional)	Number of cites (fractional)	Number of papers (whole)
Commonwealth of Australia	53.5	299.5	289
UNIV MELBOURNE	21.5	165.0	132
AMRAD CORP. LTD.	15.0	117.0	83
St. Jude Medical Inc.	14.5	26.5	25
BIOTECHNOLOGY AUSTRALIA PTY. LTD.	12.5	112.8	153
AUSTRALIAN NAT'L UNIV., THE	11.0	47.5	46
Lubrizol Corp	10.5	107.0	93
HOWARD FLOREY INST. OF EXPERIMENTAL PHYS'LOGY	10.0	36.0	18
Ludwig Institute for Cancer Research	8.0	31.0	27
US Dept Health & Human Services	7.0	67.0	56
LUMINIS PTY. LTD.	6.3	36.3	37
ELECTROSCAN CORP.	6.0	11.0	2
Unisearch Limited	6.0	12.0	12
UNIV QUEENSLAND	6.0	26.0	41
University of California	6.0	106.0	63
Roche Holding Ltd	5.5	68.0	73
GROPEP PTY LTD.	5.3	121.0	56
Schering-Plough Corp	5.0	21.0	20
GENE SHEARS PTY. LTD.	5.0	166.0	40
UNIV SYDNEY	4.5	42.0	70
University of Florida	4.0	15.0	7
GARVAN INSTITUTE OF MEDICAL RESEARCH	4.0	29.0	28
FINANCIAL SYSTEMS TECHNOLOGY PTY LTD	4.0	4.0	1
Canon Inc	3.5	3.5	3
Chiron Corp	3.5	14.0	15
FLINDERS UNIVERSITY OF SOUTH AUSTRALIA, THE	3.5	6.5	5
Lucent Technologies	3.0	7.0	7
BIOTA SCIENTIFIC MGMT. PTY.LTD.	3.0	13.0	7
BUNGE (AUSTRALIA) PTY. LTD.	3.0	13.0	13
INT'L FLOWER DEVELOPMENTS PTY. LTD.	3.0	8.0	5
LIONS EYE INST. OF WESTERN AUSTRALIA INC.	3.0	6.0	4
LIFECELL CORP.	3.0	23.0	21
MIT/Mass Inst of Technology	3.0	51.0	20
GENETYPE AG	3.0	22.0	20

Table 46. Top assignees of 1988—1997 Australian-invented U.S. biotechnology patents citing science papers

Assignee	Number of patents (fractional)	Number of cites (fractional)	Number of papers (whole)
AMRAD CORP. LTD.	8.0	71.0	55
Commonwealth of Australia	8.0	128.0	139
Lubrizol Corp	6.5	70.0	58
HOWARD FLOREY INST. OF EXPERIMENTAL PHYS'LOGY	6.0	26.0	16
US Dept Health & Human Services	5.0	59.0	52
GENE SHEARS PTY. LTD.	5.0	166.0	40
LUMINIS PTY. LTD.	4.0	27.0	27
University of California	4.0	100.0	57
UNIV MELBOURNE	3.3	32.7	30
Roche Holding Ltd	3.0	19.0	33
AUSTRALIAN NAT'L UNIV., THE	3.0	7.0	7
MIT/Mass Inst of Technology	3.0	51.0	20
GARVAN INSTITUTE OF MEDICAL RESEARCH	3.0	21.0	20
FLINDERS UNIVERSITY OF SOUTH AUSTRALIA, THE	2.5	2.5	1
BIOTECHNOLOGY AUSTRALIA PTY. LTD.	2.5	40.5	46
Ludwig Institute for Cancer Research	2.0	7.0	7
CAMBIA BIOSYSTEMS LLC	2.0	47.0	24
ALKO AB, OY	2.0	31.0	31
GENETYPE AG	2.0	17.0	16
Novo Nordisk A/S	2.0	21.0	21
MUCAN DIAGNOSTICS PTY., LTD.	2.0	12.0	8
Dow Chemical Co	2.0	34.0	33
UNIV SYDNEY	1.5	5.0	6

Table 47. Top assignees of 1988—1997 Australian-invented U.S. pharmaceutical patents citing science papers

Assignee	Number of patents (fractional)	Number of cites (fractional)	Number of papers (whole)
Commonwealth of Australia	9.5	59.5	60
UNIV MELBOURNE	6.8	36.0	42
GROPEP PTY LTD.	4.3	102.0	56
BIOTECHNOLOGY AUSTRALIA PTY. LTD.	4.3	28.5	70
University of Florida	4.0	15.0	7
AMRAD CORP. LTD.	3.0	24.0	20
AUSTRALIAN NAT'L UNIV., THE	3.0	22.0	20
LUMINIS PTY. LTD.	2.0	9.0	9
Ludwig Institute for Cancer Research	2.0	13.0	13
CARLBIOTECH LTD. A/S	2.0	7.0	7
MONASH UNIV.	1.8	19.0	60
Schering-Plough Corp	1.7	6.3	10
UNIV QUEENSLAND	1.5	16.5	31
NEW ZEALAND MINISTRY OF AGRIC. & FISHERIES	1.3	6.0	9

Table 48. Top assignees of 1988—1997 Australian-invented U.S. chemical patents citing science papers

Assignee	Number of patents (fractional)	Number of cites (fractional)	Number of papers (whole)
Commonwealth of Australia	15.5	67.5	53
UNIV MELBOURNE	7.0	87.0	70
HOWARD FLOREY INST. OF EXPERIMENTAL PHYS'LOGY	4.0	10.0	8
Ludwig Institute for Cancer Research	4.0	11.0	11
BIOTECHNOLOGY AUSTRALIA PTY. LTD.	3.8	41.8	69
Schering-Plough Corp	3.0	14.0	10
AMRAD CORP. LTD.	3.0	17.0	17
Chiron Corp	2.5	13.0	14
BIOTA SCIENTIFIC MGMT. PTY.LTD.	2.0	11.0	6
BIOCHEMICAL VETERINARY RESEARCH PTY. LTD.	2.0	7.0	3
BUNGE (AUSTRALIA) PTY. LTD.	2.0	12.0	12
Lubrizol Corp	2.0	11.0	11
UNIV SYDNEY	2.0	35.0	62
CENTRAL SYDNEY AREA HEALTH SERVICE	1.5	36.5	51
AUSTRALIAN NAT'L UNIV., THE	1.5	9.0	16
Roche Holding Ltd	1.5	21.5	27

Table 49. Top assignees of 1988—1997 Australian-invented U.S. patents of all other categories citing science papers

Assignee	Number of patents (fractional)	Number of cites (fractional)	Number of papers (whole)
Commonwealth of Australia	20.5	44.5	44
St. Jude Medical Inc.	14.0	25.0	22
ELECTROSCAN CORP.	6.0	11.0	2
Unisearch Limited	5.0	7.0	7
UNIV MELBOURNE	4.3	9.3	16
FINANCIAL SYSTEMS TECHNOLOGY PTY LTD	4.0	4.0	1
Canon Inc	3.5	3.5	3
UNIV QUEENSLAND	3.5	4.5	5
AUSTRALIAN NAT'L UNIV., THE	3.5	9.5	7
Lucent Technologies	3.0	7.0	7
LIONS EYE INST. OF WESTERN AUSTRALIA INC.	3.0	6.0	4
AUSTRALIAN TELECOMMUNICATION CORP.	2.0	9.0	5
BELL-IRH LTD.	2.0	2.0	2
BIOTECHNOLOGY AUSTRALIA PTY. LTD.	2.0	2.0	2
National Research Development Corp	2.0	4.0	4
EMOLEUM (AUSTRALIA) LTD.	2.0	2.0	1
Lubrizol Corp	2.0	26.0	26
COCHLEAR PTY. LTD.	2.0	3.0	3
INT'L FLOWER DEVELOPMENTS PTY. LTD.	2.0	6.0	4
ICI AUSTRALIA OPERATIONS PTY. LTD.	2.0	4.0	2
Science Applications Int'l	2.0	3.0	3
SWIG PTY LTD	2.0	4.0	2
U.S. Commerce Department	2.0	7.0	7
BIO POLYMERS PTY. LTD.	1.5	6.5	6
University of California	1.5	4.5	3

Table 50. Top fields and subfields of papers cited by 1988–1997 Australian-invented U.S. patents (whole counts)

Field/Subfield of Cited Paper	Number of cites	Number of papers
Field		
BIOMEDICAL RESEARCH	1728	1141
CLINICAL MEDICINE	968	761
CHEMISTRY	143	110
BIOLOGY	120	103
PHYSICS	68	61
ENGINEERING & TECHN	51	47
EARTH AND SPACE	10	8
PSYCHOLOGY	1	1
Subfield		
Biochem & Molec Biol	741	453
Genrl Biomedical Res	510	327
Immunology	220	180
Endocrinology	130	75
Genrl & Internal Med	126	91
Genetics & Heredity	120	90
Virology	90	59
Cancer	89	71
Microbiology	86	74
Botany	60	51
Hematology	57	47
Cardiovascular Systm	54	46
Cell Biol Cyt & Hist	54	43
General Chemistry	54	33
Pharmacology	50	42
Applied Physics	38	31
Surgery	37	31
Biomedical Enginrng	31	27
Veterinary Medicine	31	29
Parasitology	26	19
Electr Eng & Elctron	25	25
Organic Chemistry	24	21
Gastroenterology	21	16
Dairy & Animal Sci	20	19
Physical Chemistry	20	20

Table 51. Top fields and subfields of papers cited by 1988–1997 Australian-invented biotechnology U.S. patents (whole counts)

Field/Subfield of Cited Paper	Number of cites	Number of papers
Field		
BIOMEDICAL RESEARCH	1024	707
CLINICAL MEDICINE	227	205
BIOLOGY	42	32
CHEMISTRY	8	5
PHYSICS	1	1
Subfield		
BIOCHEM & MOLEC BIOL	442	281
GENRL BIOMEDICAL RES	291	193
GENETICS & HEREDITY	101	79
IMMUNOLOGY	75	69
MICROBIOLOGY	70	61
VIROLOGY	60	41
GENRL & INTERNAL MED	39	32
CELL BIOL CYT & HIST	30	25
ENDOCRINOLOGY	17	17
BIOMEDICAL ENGINRNG	15	13
BOTANY	15	12
CARDIOVASCULAR SYSTM	15	13
ENTOMOLOGY	15	8
HEMATOLOGY	15	14
CANCER	14	11
PARASITOLOGY	9	9
VETERINARY MEDICINE	7	7
AGRICULT & FOOD SCI	6	6
GENERAL CHEMISTRY	6	3
PATHOLOGY	6	6
PHARMACOLOGY	5	4
RESPIRATORY SYSTEM	5	5
ALLERGY	4	3
DAIRY & ANIMAL SCI	4	4
DERMAT & VENERL DIS	4	4
NEUROL & NEUROSURG	4	4

Table 52. Top fields and subfields of papers cited by 1988–1997 Australian-invented pharmaceutical U.S. patents (whole counts)

Field/Subfield of Cited Paper	Number of cites	Number of papers
Field		
CLINICAL MEDICINE	303	265
BIOMEDICAL RESEARCH	293	221
CHEMISTRY	26	20
BIOLOGY	15	15
ENGINEERING & TECHN	2	2
PHYSICS	2	2
Subfield		
BIOCHEM & MOLEC BIOL	145	105
GENRL BIOMEDICAL RES	88	66
IMMUNOLOGY	57	49
ENDOCRINOLOGY	52	43
CANCER	45	40
PHARMACOLOGY	37	33
GENRL & INTERNAL MED	27	23
VETERINARY MEDICINE	20	19
VIROLOGY	17	15
PARASITOLOGY	14	9
GENERAL CHEMISTRY	13	7
HEMATOLOGY	10	10
NEUROL & NEUROSURG	10	8
DAIRY & ANIMAL SCI	9	9
FERTILITY	9	9
CARDIOVASCULAR SYSTM	8	5
CELL BIOL CYT & HIST	8	8
ORGANIC CHEMISTRY	7	7
RADIOLOGY & NUCL MED	7	7
GASTROENTEROLOGY	6	5
GENETICS & HEREDITY	6	6
PHYSIOLOGY	6	3
PATHOLOGY	5	4
MICROBIOLOGY	4	4
PEDIATRICS	4	4

Table 53. Top fields and subfields of papers cited by 1988–1997 Australian-invented chemical U.S. patents (whole counts)

Field/Subfield of Cited Paper	Number of cites	Number of papers
Field		
BIOMEDICAL RESEARCH	281	243
CLINICAL MEDICINE	257	201
CHEMISTRY	67	57
BIOLOGY	24	24
EARTH AND SPACE	4	3
ENGINEERING & TECHN	3	3
PHYSICS	1	1
Subfield		
BIOCHEM & MOLEC BIOL	119	101
GENRL BIOMEDICAL RES	95	83
IMMUNOLOGY	73	62
ENDOCRINOLOGY	61	41
GENRL & INTERNAL MED	26	19
CANCER	25	19
GENERAL CHEMISTRY	25	18
HEMATOLOGY	25	21
BOTANY	14	14
ANALYTICAL CHEMISTRY	13	12
ORGANIC CHEMISTRY	13	11
VIROLOGY	13	13
GENETICS & HEREDITY	11	11
NUTRITION & DIETET	11	10
PHYSICAL CHEMISTRY	10	10
MICROBIOLOGY	9	7
MISC BIOMEDICAL RES	9	6
ALLERGY	8	8
PHARMACY	8	4
CELL BIOL CYT & HIST	6	5
UROLOGY	6	6
AGRICULT & FOOD SCI	5	5
PHARMACOLOGY	5	3
DAIRY & ANIMAL SCI	4	4
FERTILITY	4	4
INORGANIC & NUCL CHM	4	4
VETERINARY MEDICINE	4	3

Table 54. Top fields and subfields of papers cited by 1988–1997 Australian-invented U.S. patents in all other categories (whole counts)

Field/Subfield of Cited Paper	Number of cites	Number of papers
Field		
CLINICAL MEDICINE	181	155
BIOMEDICAL RESEARCH	130	107
PHYSICS	64	58
ENGINEERING & TECHN	46	42
CHEMISTRY	42	34
BIOLOGY	39	33
EARTH AND SPACE	6	5
PSYCHOLOGY	1	1
Subfield		
APPLIED PHYSICS	37	31
GENRL BIOMEDICAL RES	36	31
BIOCHEM & MOLEC BIOL	35	31
GENRL & INTERNAL MED	34	29
SURGERY	33	27
BOTANY	31	26
CARDIOVASCULAR SYSTM	31	28
ELECTR ENG & ELCTRON	25	25
IMMUNOLOGY	15	11
MICROSCOPY	14	4
BIOMEDICAL ENGINRNG	13	13
OPHTHALMOLOGY	12	9
OPTICS	12	12
POLYMERS	11	7
CELL BIOL CYT & HIST	10	8
GASTROENTEROLOGY	10	9
GENERAL CHEMISTRY	10	7
MATERIALS SCIENCE	10	10
BIOPHYSICS	9	9
COMPUTERS	7	3
HEMATOLOGY	7	7
PHYSICAL CHEMISTRY	6	6
RADIOLOGY & NUCL MED	6	6
AGRICULT & FOOD SCI	5	5
ANESTHESIOLOGY	5	5
APPLIED CHEMISTRY	5	4
CANCER	5	5
DERMAT & VENERL DIS	5	3

Table 55. Top author countries of papers cited by 1988—1997 Australian-invented U.S. patents (whole counts)

Country of Paper Author	Number of cites	Number of papers
US	1558	1138
AUSTRALIA	691	432
UNITED KINGDOM	274	206
JAPAN	168	121
CANADA	114	100
GERMANY	109	89
FRANCE	80	57
SWITZERLAND	76	61
SWEDEN	63	36
NETHERLANDS	58	46
ISRAEL	49	34
AUSTRIA	36	22
ITALY	36	31
BELGIUM	27	23
DENMARK	27	23
FINLAND	27	24
NEW ZEALAND	20	12
INDIA	14	8
HUNGARY	12	10
GREECE	7	2
SPAIN	7	7
BRAZIL	6	5
TAIWAN	6	5
USSR	6	6
EGYPT	5	4
NORWAY	5	5
PEOPLES R CHINA	5	3
HONG KONG	4	2
SOUTH AFRICA	4	3
YUGOSLAVIA	4	2
COLOMBIA	3	3
CZECHOSLOVAKIA	3	3
IRELAND	3	3
SOUTH KOREA	3	2
ARGENTINA	2	2
POLAND	2	2
UKSSR	2	2
KENYA	1	1
MALAYSIA	1	1

Table 56. Australian cross-citation by sector (fractional counting; patents by private entity inventors include foreign assignees)

Citing Patent Sector	Cited Paper Sector								
	Total of cites	CSIRO	Government	Hospital (govt/no univ affil)	Hospital (govt/univ affil)	Medical Research Ctr (no univ affil)	Medical Research Ctr (univ affil)	Private Entity	University
Total cites from citing patent sector to cited paper sector									
CSIRO	75.0	47.5	4.8		1.0		0.8	2.3	18.5
Government	36.0	2.0	5.1	0.1	16.4		1.0		11.3
Hospital (govt/univ afil)	9.3			0.1			2.6	0.2	6.4
Medical Research Ctr (univ affil)	46.3			1.1			29.5	0.2	15.5
Private Entity	356.6	56.8	12.8	3.3	40.1	2.0	65.7	13.1	162.8
University	131.9	14.1	1.1	1.9	6.7		17.9	1.2	89.1
Totals	655.0	120.4	23.9	6.4	64.2	2.0	117.6	17.0	303.6
Overall percentage of cites from citing patent sector to cited paper sector									
CSIRO	11.5	7.3	0.7		0.2		0.1	0.4	2.8
Government	5.5	0.3	0.8	0.0	2.5		0.2		1.7
Hospital (govt/univ afil)	1.4			0.0			0.4	0.0	1.0
Medical Research Ctr (univ affil)	7.1			0.2			4.5	0.0	2.4
Private Entity	54.4	8.7	2.0	0.5	6.1	0.3	10.0	2.0	24.9
University	20.1	2.2	0.2	0.3	1.0		2.7	0.2	13.6
Totals	100.0	18.4	3.7	1.0	9.8	0.3	17.9	2.6	46.3
Percentage of citing patent sector cites to each cited paper sector									
CSIRO	100.0	63.3	6.4		1.3		1.1	3.1	24.7
Government	100.0	5.6	14.2	0.3	45.6		2.9		31.4
Hospital (govt/univ afil)	100.0			0.9			28.3	2.0	68.8
Medical Research Ctr (univ affil)	100.0			2.3			63.7	0.4	33.6
Private Entity	100.0	15.9	3.6	0.9	11.2	0.6	18.4	3.7	45.7
University	100.0	10.7	0.9	1.4	5.1		13.5	0.9	67.5
Totals	100.0	18.4	3.7	1.0	9.8	0.3	17.9	2.6	46.3
Percentage of cited paper sector's cites from each citing patent sector									
CSIRO	11.5	39.4	20.2		1.6		0.7	13.7	6.1
Government	5.5	1.7	21.4	1.9	25.6		0.9		3.7
Hospital (govt/univ afil)	1.4			1.3			2.2	1.1	2.1
Medical Research Ctr (univ affil)	7.1			16.9			25.1	1.1	5.1
Private Entity	54.4	47.2	53.7	50.6	62.5	100.0	55.9	77.1	53.6
University	20.1	11.7	4.7	29.2	10.4		15.2	7.0	29.3
Totals	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 57. Australian cross-citation between citing patent sector and citing paper sector, by paper field (fractional counting; patents by private entity inventors include foreign assignees)

Citing Patent Sector	Cited Paper Sector								
	Total of citations	CSIRO	Government	Hospital (govt/no univ affil)	Hospital (govt/univ affil)	Medical Research Ctr (no univ affil)	Medical Research Ctr (univ affil)	Private Entity	University
Biology									
CSIRO	6.5	5.0							1.5
Government	3.0	1.0							2.0
Private Entity	15.5	2.0	3.5						10.0
University	1.0								1.0
Totals	26.0	8.0	3.5						14.5
Biomedical									
CSIRO	60.5	35.5	4.8		1.0		0.8	2.3	16.0
Government	28.0	1.0	0.1	0.1	16.4		1.0		9.3
Hospital (govt/univ afil)	9.3			0.1			2.6	0.2	6.4
Medical Research Ctr (univ affil)	45.6			1.1			29.1	0.2	15.2
Private Entity	322.4	53.8	8.8	3.3	40.1	2.0	65.4	12.6	136.5
University	118.3	14.1	1.1	1.9	6.7		17.5	1.2	75.7
Totals	584.0	104.4	14.9	6.4	64.2	2.0	116.6	16.5	259.1
Chemistry									
CSIRO	1.0	1.0							
Medical Research Ctr (univ affil)	0.7						0.3		0.3
Private Entity	13.7						0.3		13.3
University	9.7						0.3		9.3
Totals	25.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	23.0
Engineering & Technology									
CSIRO	2.0	1.0							1.0
Government	1.0		1.0						
Private Entity	1.0							0.5	0.5
Totals	4.0	1.0	1.0					0.5	1.5
Physics									
CSIRO	5.0	5.0							
Government	4.0		4.0						
Private Entity	3.0	1.0							2.0
University	3.0								3.0
Totals	15.0	6.0	4.0	0.0	0.0	0.0	0.0	0.0	5.0
Other									
Private Entity	3.0	1.0							2.0

Table 58. Australian cross-citation between citing technology and citing paper sector (fractional counting; patents by private entity inventors include foreign assignees)

Citing Patent Technology	Cited Paper Sector								
	Total of citations	CSIRO	Government	Hospital (govt/no univ affil)	Hospital (govt/ univ affil)	Medical Research Ctr (no univ affil)	Medical Research Ctr (univ affil)	Private Entity	University
Total cites from citing patent technology to cited paper sector									
BIOTECHNOLOGY	250.0	50.1	5.0	1.5	12.7		61.2	5.6	114.0
CHEMICALS	160.0	16.6	6.1	0.8	27.7		26.7	1.5	80.7
PHARMACEUTICALS	177.0	34.4	6.0	6.8	15.3		22.6	9.4	82.5
OTHER	95.0	22.5	7.0	0.3	11.3	2.0	12.2	0.5	39.2
Totals	682.0	123.6	24.1	9.4	67.0	2.0	122.6	17.0	316.4
Overall percentage of cites from citing patent technology to cited paper sector									
BIOTECHNOLOGY	36.7	7.3	0.7	0.2	1.9		9.0	0.8	16.7
CHEMICALS	23.5	2.4	0.9	0.1	4.1		3.9	0.2	11.8
PHARMACEUTICALS	26.0	5.0	0.9	1.0	2.2		3.3	1.4	12.1
OTHER	13.9	3.3	1.0	0.0	1.7	0.3	1.8	0.1	5.7
Totals	100.0	18.1	3.5	1.4	9.8	0.3	18.0	2.5	46.4
Percentage of citing patent technology cites to each cited paper sector									
BIOTECHNOLOGY	100.0	20.0	2.0	0.6	5.1		24.5	2.2	45.6
CHEMICALS	100.0	10.4	3.8	0.5	17.3		16.7	1.0	50.5
PHARMACEUTICALS	100.0	19.4	3.4	3.9	8.7		12.7	5.3	46.6
OTHER	100.0	23.7	7.4	0.4	11.9	2.1	12.8	0.5	41.2
Totals	100.0	18.1	3.5	1.4	9.8	0.3	18.0	2.5	46.4
Percentage of cited paper sector's cites from each citing patent technology									
BIOTECHNOLOGY	36.7	40.5	20.8	15.9	18.9		49.9	32.9	36.0
CHEMICALS	23.5	13.4	25.3	8.0	41.3		21.7	9.0	25.5
PHARMACEUTICALS	26.0	27.8	24.9	72.6	22.9		18.4	55.2	26.1
OTHER	13.9	18.2	29.1	3.5	16.9	100.0	9.9	2.9	12.4
Totals	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0